

## **TECHNICAL FISHERY REPORT 92-22**

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Alaska Department of Fish and Game  
Division of Commercial Fisheries  
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### **Contribution, Exploitation, and Migratory Timing of Lynn Canal Sockeye Salmon Runs in 1989 Based on Analysis of Scale Patterns**

by

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**Mark A. Olsen**

The Technical Fishery Report Series was established in 1987, replacing the Technical Data Report Series. The scope of this new series has been broadened to include reports that may contain data analysis, although data oriented reports lacking substantial analysis will continue to be included. The new series maintains an emphasis on timely reporting of recently gathered information, and this may sometimes require use of data subject to minor future adjustments. Reports published in this series are generally interim, annual, or iterative rather than final reports summarizing a completed study or project. They are technically oriented and intended for use primarily by fishery professionals and technically oriented fishing industry representatives. Publications in this series have received several editorial reviews and at least one *blind* peer review refereed by the division's editor and have been determined to be consistent with the division's publication policies and standards.

CONTRIBUTION, EXPLOITATION, AND MIGRATORY TIMING OF  
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BASED ON ANALYSIS OF SCALE PATTERNS

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## ABSTRACT

We used visual interpretation of scale circuli patterns from three sockeye salmon *Oncorhynchus nerka* escapements to estimate commercial catch contributions of these stocks in the Southeast Alaska commercial gillnet fishery in District 115 (Lynn Canal). Circuli patterns in the freshwater growth zone provided the principal discriminatory characteristics. Chilkat Lake fish exhibited the largest freshwater growth zone, Chilkoot Lake the smallest, and Berners Bay and mainstem Chilkat River stocks, a zone intermediate in size. The minimum estimated total run of sockeye salmon to Lynn Canal in 1989 was 669,756 fish, of which 471,934 (70%) were harvested and 197,822 escaped to spawn. The Chilkat Lake run contributed 299,921 fish, of which 159,446 (53%) were harvested and 140,475 escaped to spawn. Chilkoot Lake contributed 346,763 fish, of which 291,863 (84%) were harvested and 54,900 escaped to spawn. The Berners Bay/Chilkat Mainstem contribution included a harvest of 20,625 fish in District 115; these stocks were enumerated only for peak single-day escapements, not for total escapements. Single-day escapement counts in the surveyed areas peaked at 2,447 sockeye salmon. Mean length of Chilkat Lake fish was greater than fish from Chilkoot Lake of the same sex and age. The mean date of harvest of the three runs was dissimilar; 15 July for Berners Bay/Chilkat Mainstem, 29 July for Chilkoot Lake, and 2 August for Chilkat Lake. The mean date of escapement was 15 July for the Chilkoot run and 22 August for the Chilkat run. Historical age composition data revealed that the Chilkoot Lake run was composed principally of age-1. fish and the Chilkat Lake run principally of age-2. fish. Chilkoot Lake produced more fish per spawner than Chilkat Lake.

**KEY WORDS:** Sockeye salmon, scale pattern analysis, stock contributions, Chilkoot Lake, Chilkat Lake, Lynn Canal, total run, escapement, exploitation rate, mean length, brood year returns

## INTRODUCTION

The population of sockeye salmon *Oncorhynchus nerka* which returns to Lynn Canal (District 115) each year is presently the largest sockeye population that spawns in Southeast Alaska. From 1982 to 1989 catches in Lynn Canal have accounted for an average of 26% of the total sockeye catch in Southeast Alaska, including set gillnet catches in the Yakutat area (ADF&G 1990). During the same period Lynn Canal catches represented 48% of the drift gillnet catch of sockeye salmon in the Region. Because this resource is so valuable, fisheries managers need an information system that will allow a maximum harvest while providing an optimum level of escapement. The Lynn Canal sockeye salmon population is intensively managed by the Alaska Department of Fish and Game (ADF&G) using an information system which relies on analysis of scale samples collected from the fishery and from the spawning populations, or stocks, that contribute to the fishery (McPherson 1990).

The Lynn Canal (District 115) drift gillnet fishery operates in the waters of Southeast Alaska north of Little Island (Figure 1). Although all five species of eastern Pacific salmon *Oncorhynchus* are harvested, the fleet targets sockeye salmon from June through late August. Sockeye salmon harvested in Lynn Canal originate primarily from the Chilkoot Lake and Chilkat Lake drainages, but small spawning populations which utilize river habitat have been found in several locations along the mainstem of the Chilkat River and along the Lace, Antler-Gilkey, and Berners Rivers in Berners Bay.

Stockley (1950) first documented the obvious differences in freshwater scale patterns of adult sockeye salmon from Chilkoot Lake and Chilkat Lake. Bergander (1973) collected scales from the fishery for use in determining the river systems of origin: he in 1974 demonstrated the feasibility of identifying fish from these lakes using circuli counts and size of the freshwater zone in a dichotomous key that contained cutoff points to delineate each lake. Bergander (1982) used this method for estimating catch contributions for Chilkoot Lake and Chilkat Lake from 1975 through 1980. During the 1981 season the sample design was improved and stock contributions were estimated using linear discriminant function analysis (LDF) to sort linear scale measurements on a mainframe computer (Marshall et al. 1982). During the 1981 and 1982 seasons scale measurements from age-1.3 fish in the catch were classified using LDF to estimate stock contributions for that age class (McPherson et al. 1983). The ratio of age-1.3 fish to other age classes in each lake's escapement was used to estimate the catch contributions of other age classes. McPherson and Marshall (1986) demonstrated, using the 1983 data, that visual classification of scale patterns could be used to accurately classify all age classes of Chilkoot Lake and Chilkat Lake fish. This method was simpler and faster, and by classifying all catch scales, a variance estimate around the entire stock contribution could be calculated. A third stock group, the combined Berners Bay and Chilkat Mainstem stocks, was added to the visual classification technique to analyze the 1985-88 data (McPherson 1987; McPherson and Jones 1987; McPherson 1989; McPherson et al. *in press*).

Estimation of the numbers of fish harvested by stock is essential for fishery management. The stock composition of the catch, coupled with escapement counts, provide estimates of total return by brood year and rates of exploitation. Brood year return data are needed to evaluate optimum escapement requirements and to forecast interannual returns. Exploitation rates by stock and age class provide managers with additional information with which to adjust the time and location of fishery openings in order to achieve desired escapements. The temporal distribution of catches by stock and age is essential for calculating cumulative migratory time densities (Mundy 1979) that, when integrated with average timing data and historical cumulative time densities, form the basis for inseason abundance forecasting.

The purposes of this report are to (1) evaluate the accuracy of visually classifying the three sockeye salmon stocks -- Chilkoot Lake, Chilkat Lake, and the combined Berners Bay and Chilkat River mainstem stock in the Lynn Canal fishery; (2) present the catch, escapement, total run, and exploitation rates of each

stock by age; (3) provide average length and migratory timing data; and (4) present brood year tables and historical catches and escapements.

## METHODS

### *Numbers of Fish*

We compiled commercial catch data for District 115 from individual receipts, available on 1 January 1990, given to fishermen by buyers at the time of delivery. Subsequent catch tabulations may differ slightly from those presented because errors since then may have been detected and corrected. Catches were reported by fishing period and assigned to statistical weeks which begin at 0001 hours each Sunday and end the following Saturday at 2400 hours. Weeks are numbered sequentially beginning with the first week in January.

ADF&G weir crews count escapements into Chilkoot Lake and Chilkat Lake (Figure 1). The Chilkoot River weir, located approximately 0.5 km upstream of the river mouth, was operated from 4 June through 30 October. The Chilkat Lake weir, located at the lake outlet approximately 35 km upstream from the mouth of Chilkat River, was operated from 7 June through 29 October.

### *Age, Sex, and Length*

Escapements at the Chilkoot and Chilkat weirs and commercial catches were sampled throughout the season for scale, sex, and length data. ADF&G employees collected sockeye scale samples from vessel and tender landings at the ports of Excursion Inlet, Petersburg, Juneau, and Pelican. Weekly sampling goals were spread among ports in approximate proportion to the number of sockeye salmon delivered. The weekly catch sampling goal of 700 scales was designed to obtain at least 550 ageable scales. Using standard binomial equation (Cochran 1977), this provided estimates of each age class within 5% of the true proportion 90% of the time. The weekly goal was obtained during every week of the season except the first week and weeks after September 9 when catches were low. The escapement sampling goal at the weirs was to collect sufficient samples to estimate the proportion of each age class on a biweekly basis with the same accuracy and precision. Samples were taken from the spawning grounds on the Berners, Lace, and Antler-Gilkey Rivers in Berners Bay and along the mainstem of the Chilkat River in locations where sockeye salmon were concentrated in clear tributaries. These samples were temporally and spatially limited and may not be representative of the entire Berners Bay/Chilkat Mainstem population.

Scales were obtained from the left side of the fish as shown in Mosher et al. (1961). Scales were mounted on gummed cards and impressions made in cellulose acetate (Clutter and Whitesel 1956). Age was determined by visually examining scale impressions magnified 70x on a microfiche reader; criteria for age determination followed methods developed by Region I aging supervisors in addition to those of Mosher (1968). Length frequency analysis was used to determine the ages of scales from escapement collections that exhibited a high degree of resorption of the marine growth zone. Ages were reported in European notation. Length was measured from mid-eye to fork-of-tail to the nearest 5 mm. Sex was determined by examining external dimorphic sexual maturation characteristics including kipe development, belly shape, and trunk depth. Sex determination in the catch was most often made by two samplers and, where

disagreement occurred, verified by inspecting gonads through a small incision in the belly. An experiment to determine accuracy of sex determination was implemented during the 1987 season. Examination and verification of 1,623 sockeye salmon from the commercial fishery in Lynn Canal by five samplers resulted in an overall accuracy of 94.5% (K. Pahlke, ADF&G, Division of Commercial Fisheries, Douglas, personal communication). Accuracy of sexing fish from the escapements is believed to be higher because maturation characteristics are further developed.

Estimates of the total catch or escapement of each age class were made by expanding period-age composition proportions to the number of fish during those time periods and summing the estimates across time periods. Each period included one or more statistical weeks. Standard errors in each stratum were calculated using a standard binomial equation corrected for finite population size:

$$SE_{ij} = \sqrt{\frac{[\hat{P}_{ij} (1 - \hat{P}_{ij})]}{n_j - 1} \cdot \left[1 - \frac{n_j}{C_j}\right]}, \quad (1)$$

where:  $i$  = age class,  
 $j$  = time period,  
 $\hat{P}_{ij}$  = estimated proportion of fish of age  $i$  in stratum  $j$ ,  
 $n_j$  = sample size for stratum  $j$ , and  
 $C_j$  = catch or escapement of fish in stratum  $j$ .

The standard error for each age class summed across strata in the total Lynn Canal commercial catch (or the escapements) to Chilkoot Lake or Chilkat Lake was calculated by weighting it's standard error for each sample period by the total catch (or escapement) during the sample period as follows:

$$SE_i = \sqrt{\frac{\sum_j (SE_{ij})^2 C_j^2}{C_i^2}}. \quad (2)$$

Changes in age composition among strata were tested for statistical significance using a test to compare two proportions as described in Zar (1984). Average lengths by age and sex and associated standard errors were calculated for catches and escapements from each run.

### *Scale Pattern Measurements*

Linear scale pattern measurements were recorded into an electronic database to provide quantitative illustration of the pattern differences in various scale-growth zones between stock groups. In addition, we believe that these data can be combined with the spawner-recruit database to forecast future returns.

Scale images were magnified 100 X and projected onto a Talos digitizing tablet using equipment similar to that described by Ryan and Christie (1976). Scale features were measured and recorded electronically using a FORTRAN program. Measurements were made along the anterior-posterior axis of the scale in specific zones dependent on freshwater age class (Figure 2). Within each zone the digitizer recorded the

linear distance between each circuli. A series of FORTRAN programs were used to transform and summarize the digitized scale characteristics.

### *Blind Tests*

Scale samples collected each week from District 115 were classified to stock of origin. We first determined the age of each fish from the image projected with a microfiche reader and assigned it to one of the three stocks based on scale characteristics. The numbers of each stock were summed each week to provide timely estimates of stock contribution for inseason management. To achieve the escapement goals of 60,000 - 80,000 for Chilkoot Lake and 50,000 -70,000 for Chilkat Lake, temporal and spatial adjustments were made in the fishery based on inseason forecasts of total run abundance.

Catch statistics were updated postseason, and the estimated stock proportions were corrected for misclassification in order to add precise and accurate estimates of the current year's data to the historical Lynn Canal sockeye salmon stock identification database. A blind testing procedure was used to test the accuracy of the inseason estimates and to correct for misclassification between stocks.

Escapement scales were used to develop a blind testing procedure for the Chilkoot Lake, Chilkat Lake, and combined Berners Bay and Chilkat Mainstem stocks. A separate test was designed for each individual age class that was common to two or more stocks. To construct each test, a technician selected scales from each of the three escapements according to numbers specified by a random number list, limited for some tests, by availability of scales. After selection and remounting was completed for each test, we visually classified the scales to the stock of origin. The technician compared that classification to the true origin for each scale, which defined the accuracy of the method.

Eight blind tests were developed, for fish aged 1.1, 1.2, 1.3, 1.4, 2.2, 2.3, 2.4, and 3.3 (Table 1). The tests for fish aged 1.1, 1.2, 1.3, 2.2 and 2.3 included escapement scales from all three stock groups; the other tests were composed only of Chilkoot and Chilkat Lake scales. Fish aged 0. were found only in escapements to Berners Bay/Chilkat Mainstem; therefore, a blind test was not needed for these fish.

Although the size of the freshwater annulus and the number of circuli in the freshwater growth zones were the principal scale characteristics we used to distinguish between runs, others considered were the total size of the freshwater growth zone, size of the freshwater plus growth zone, completeness of the freshwater circuli, and the spacing between the circuli in the freshwater growth zone.

### *Mixed Stock Analysis*

The results of the blind tests were used to build a correction matrix to compensate for misclassifications in each age class (Table 1). The correction matrix is a square matrix with one column and one row for each group. Each row represents the true stock of origin and each column the proportion of the scales in each row that were actually classified to each stock using the visual classification procedure. Diagonal elements in the matrix represent correctly classified scales, and off-diagonal elements represent scales that were misclassified to the other two stocks.

The proportional estimates of stock composition from the inseason analysis, referred to as initial estimates, were adjusted by applying a classification model and its correction matrix (Cook and Lord 1978). This resulted in a vector containing adjusted proportions, referred to as corrected estimates. One vector of corrected estimates was calculated for each stock in each age class for each fishing period of the season using a FORTRAN program. In cases where corrected proportions for any stock were less than zero, the entire catch sample was reclassified with a model excluding that stock group.

The standard error of the corrected estimates of stock proportions were computed using the procedures of Pella and Robertson (1979). The variance-covariance matrices for the misclassification matrix and for the mixed stock proportion vector were determined from the multinomial probability distribution. These two matrices were combined to give variances and covariances for the corrected estimates of stock proportions. The variances for the proportions of each stock were the diagonal elements of this combined matrix, i.e., they were an additive combination of the sampling variation in estimation of the probability of assignment of the known stock, and the sampling variation in estimation of the assignment of the mixed stock samples.

Catch samples were classified to stock and age class within statistical week, corrected for misclassification, and expanded to the catch size of that week.

The variance of the entire weekly and seasonal proportions to one stock across the 12 age classes was estimated with the delta method (Seber 1982) using a FORTRAN program to output variance estimates. The variance estimate was a function of (1) age composition of the catch, (2) stock proportions within each age class, (3) standard errors of stock proportions due to misclassification from Pella-Robertson calculation, (4) weekly scale sample size, and (5) catch size. See Appendix C in Oliver et al. (1985) for a detailed description of this procedure.

### *Migratory Timing and Dispersion*

Migratory timing, i.e., abundance as a function of time, was the primary basis for management strategies which regulated time and location of fishery openings to selectively harvest the target stock or species. Migratory timing statistics for the harvest of all three stocks and the weired escapements were calculated, following the methods of Mundy (1979, 1982), to provide an index of relative timing.

To calculate mean and variance, the empirical migratory time density was defined to be the time series of daily or weekly proportions,  $P_t$ , such that

$$P_t = \frac{n_t}{N} \quad , \quad (3)$$

where:

$$\begin{aligned} n_t &= \text{abundance on time interval } t, \text{ and} \\ N &= \text{total annual abundance.} \end{aligned}$$

For a migration over a time interval of  $n$  days or weeks, the mean of  $t$  was

$$\bar{t} = \sum_{t=1}^n t (P_t) \quad , \quad (4)$$

and its variance was



$$S_t^2 = \sum_{i=1}^n (t - \bar{t})^2 P_i \quad (5)$$

The mean day and mean week of weired escapements and catch by stock were calculated.

## RESULTS

### *Scale Pattern Measurements*

Typical magnified scale patterns for fish aged 1.1, 1.2, 1.3, and 1.4 and aged 2.1, 2.2, and 2.3 from each of the three stocks are shown in Figures 3 and 4.

Large and consistent differences in mean number of circuli (NC) and incremental distances (ID) were found between digitized age-1.3 escapement scales for Chilkoot and Chilkat Lake, especially so for ID values (Table 2). For example, the average NC in the first freshwater year was 14.0 for Chilkat Lake and 6.1 for Chilkoot Lake; the average ID was 176.0 for Chilkat Lake and 64.6 for Chilkoot Lake. Because the proportional differences were greater for the ID values, the average distance between circuli was less for Chilkoot Lake, 10.6 per circuli, and greater for Chilkat Lake, 12.6. The difference in average circuli ID can be seen in the scale photographs in Figures 3 and 4. Chilkoot Lake fish grew more in the first marine year than Chilkat Lake fish: ID = 438 versus 378.

Frequency distributions of the NC and ID values for individual age-1.3 fish are graphed in Appendices A.1-A.4 for selected scale variables. ID values in the first freshwater year show that very little overlap, i.e., one scale, was present between Chilkat Lake and Chilkoot Lakes. The same differences were present for the ID values in the total freshwater zone, although the overlap was less (Appendix A.3.)

### *Blind Tests*

Table 1 summarizes the results of the eight blind tests used to determine the accuracy of visual classification of fish from the Chilkoot, Chilkat, and Berners Bay/Chilkat Mainstem systems. Overall accuracy was high in all tests: 96% to 100%. Among age-1.3 fish, the most abundant single age class in the fishery, overall classification accuracy was 96%. For Chilkoot Lake 2% and for Chilkat Lake 5% of the fish classified to Berners/Mainstem; and 5% of the Berners/Mainstem classified to each of the other two stocks. This relatively balanced misclassification trend indicated that the initial and corrected estimates for all stocks in this age class were similar.

The corrected postseason proportions were similar to the inseason estimates; postseason differences were 0.002 for Chilkoot Lake, 0.009 for Chilkat Lake, and 0.011 for Berners Bay/Chilkat Mainstem (Table 3).

## Harvest

Annual sockeye salmon harvests in Lynn Canal (District 115) ranged between 18,388 and 415,815 sockeye salmon from 1960 to 1988, averaging 155,596 fish (Table 4). Annual harvests during the most recent five years, 1984 to 1988, averaged 364,070 fish. The 1989 harvest of 471,934 was the highest annual harvest in this database.

The 1989 harvest of sockeye salmon in Lynn Canal occurred over a 14-week period (Table 5). Management strategies to selectively harvest or protect stocks of sockeye, chinook (*O. tshawytscha*), coho (*O. kisutch*), pink (*O. gorbuscha*), or chum (*O. keta*) salmon resulted in considerable variation in the time and locations open to fishing each week.

Sockeye salmon aged 1.3 dominated the catch (50.4%) followed by fish aged 2.3 (31.6%), and 2.2 (12.8%); other age classes accounted for approximately 5% of the catch (Appendix B.1). Temporal trends in age composition of the catch were evident (Figure 5; Appendix B.1.). The percentage of fish aged 1.3 decreased significantly ( $P < 0.01$ ) during the season whereas fish aged 2.3 and 2.2 increased (Appendix B.2).

The 1989 harvest of 471,934 sockeye salmon was estimated to be composed of 61.8% (291,863) Chilkoot Lake fish, 33.8% (159,446) Chilkat Lake fish, and 20,625 fish from Berners Bay/Chilkat Mainstem (Table 6; Appendix B.3).

The harvest of Chilkoot Lake fish was primarily fish aged 1.3 (57.3%), 2.3 (33.6%), and 1.2 (3.7%; Appendix B.5). The percentage of fish aged 2.3 was the highest recorded in the harvest of Chilkoot Lake fish from 1976 to 1989. The relative abundance of fish aged 1.3 and 2.3 changed significantly ( $P < 0.01$ ) during the season (Figure 6a). The proportion of fish aged 1.3 decreased, whereas those aged 2.3 increased, a trend relatively uncommon for Chilkoot Lake and observed during only three years since 1976; 1977, 1987, and 1989. This is most likely the result of holdover of fry because of a large rearing density from the previous brood year, from an escapement of approximately 103,000 adults.

The catch of Chilkat Lake fish was split between three age classes; 1.3 (37.7%), 2.3 (31.9%), and 2.2 (29.8%; Appendix B.6). In the early part of the run age-1.3 fish dominated catches and accounted for 55.9-80.4% of the Chilkat Lake harvest (Figure 6b); they dropped to 39.2% of the catch during week 31 (26 July -- 1 August) and continued to decrease steadily to approximately 1-3% of harvest in the last three sampling periods. The relative abundance of fish aged 2.3 and 2.2 increased as the season progressed, accounting for the majority of the catch after 30 July. This increase of age-2. fish occurs annually and is related to spawning timing and subsequent emergence, rather than rearing density (McPherson 1990).

The harvest of Berners Bay/Chilkat Mainstem was composed principally of two age classes, 1.3 (51.6%) and 0.3 (41.5%; Appendix B.7).

Scales collected from specific sites in the commercial fishery were collected to gauge migration patterns for inseason management. The stock composition of these samples is presented in Appendix B.8.

### *Escapement*

Annual escapements from 1976 to 1988 averaged 84,375 sockeye salmon to Chilkoot Lake and 71,222 to Chilkat Lake (Table 4). The escapement in 1989 of 54,900 fish to Chilkoot Lake was 35% below average, whereas that to Chilkat Lake, 140,475 fish, was 97% above average. Parent year escapements in 1983 and 1984 contributed the most to the 1989 runs:

	<u>1983</u>	<u>1984</u>
Chilkoot Escapement	134,207	115,269
Chilkat Escapement	80,343	100,417

The 1989 escapement goals were 60,000 to 80,000 for Chilkoot Lake and 50,000 to 70,000 for Chilkat Lake.

The Chilkat Lake weir was operated from 7 June to 29 October (Appendix C.1). More than 58% of the escapement passing the weir occurred after 15 August (Figure 7). The escapement was characterized by two periods, before and after 15 August; historical trends have shown this date to be an approximate delineation between early and late stocks entering Chilkat Lake. The outlet stream of Chilkat Lake has been subject to flow reversals in recent years, which affect entry of spawners into Chilkat Lake. The adjoining Tsirku River is only a few feet lower in elevation where the rivers meet and when runoff is high, the Tsirku is actually higher. Under these conditions, cold glacial water flows into Chilkat Lake, and fish migrate downstream and do not migrate upstream again until after normal flow conditions return. Five short reversals of 2 to 7 days occurred in 1989; these were less than those observed from 1985 to 1988. The Chilkoot Lake weir was operated from 4 June through 30 October (Appendix C.2). The Chilkoot Lake escapement was also bimodal, with peaks occurring in mid-June and early August (Figure 7). Both escapements were spread over a long period, but the Chilkoot Lake escapement was less dispersed than the Chilkat escapement: standard deviation = 29 d for Chilkat Lake versus 35 d for Chilkoot Lake. Both escapements were the most dispersed from 1981 to 1989; the average standard deviation for Chilkoot Lake during that period was 22 d and for Chilkat Lake was 26 d.

Total escapements to the rivers of Berners Bay and the Chilkat River mainstem were not enumerated. Instead, surveys were conducted to count the total number of live and dead fish on specific days. A survey conducted in Berners Bay in August resulted in a peak count of 1,732 fish, composed of 750 fish from the Berners, 850 from the Lace, and 132 from the Antler-Gilkey Rivers (Figure 1). Peak counts for limited surveys along the Chilkat Mainstem were 715 fish and included Mosquito Lake (50 fish), the Tsirku River (400), Mule Meadows (15) and the Tahini River (250; Figure 9).

Scale samples collected from the three rivers in Berners Bay showed a majority of the fish were age 1.3 (85.3%), followed by age 1.2 (6.7%; Appendix C.3). Age-0. fish accounted for 3.9% of the Berners Bay samples. Each river in Berners Bay was dominated by age-1.3 fish: 80.6% in the Berners River, 84.9% in the Lace River, and 91.9% in the Antler-Gilkey system. Age-0. fish, composing 5.3% of the run, were found only in the Lace River samples. The combination of the samples from these three rivers is probably a good representation of the Berners Bay sockeye salmon population because (1) it is believed that the areas sampled represent the majority of the population, and (2) subsamples by river were collected in proportion to abundance in each river.

Limited scale samples from sites along the Chilkat River Mainstem indicate that age-1.3 fish composed the majority (63.1%) of these samples (Appendix C.6). Samples from sites along the lower river mainstem

indicate a majority, 56.8%, of age-0.3 fish. Those from the Tahini River, upstream, were 88.8% age-1.3 fish. The samples from the lower mainstem are more representative of the non-Chilkat Lake population of sockeye salmon in the Chilkat River drainage because the majority of these fish spawn in that area.

The Chilkat Lake escapement, like the catch, was divided between three principal age classes: 1.3 (37.6%), 2.2 (33.9%), and 2.3 (27.4%). Together they accounted for 99% of the escapements (Appendix C.4). Period estimates of age composition showed that, as in past years, fish aged 1.3 decreased significantly ( $P < 0.01$ ) in relative abundance during the season, and fish aged 2.2 and 2.3 increased significantly ( $P < 0.01$ ) (Figure 8b; Appendix C.8). Males composed 56% of the escapement. This preponderance of males was observed across most age classes except age-2.3, where males and females were equal in abundance.

In the Chilkoot Lake escapement fish aged 1.3 (55.9%) and 2.3 (34.4%) dominated samples; fish aged 2.2 (4.1%) and 1.2 (3.3%) were minor age classes (Appendix C.7). Trends in the age composition of the escapement (Figure 8a) showed that fish aged 1.3 decreased significantly ( $P < 0.01$ ) in relative abundance, whereas age-2.3 fish increased significantly ( $P < 0.01$ ) as the season progressed (Appendix C.8). Sex composition data revealed that males were more abundant (57%). This trend was evident across most periods and age classes. The same dominance of males was observed in the 1985-88 data.

### *Exploitation Rates*

The total run of sockeye salmon from Chilkoot Lake was 346,763 fish, of which 291,863 were caught and 54,900 escaped to spawn (Table 7); the exploitation rate was 84%. The total run of Chilkat Lake sockeye salmon was 299,921, of which 159,446 were harvested and 140,475 escaped to spawn; the exploitation rate was 53%.

### *Length at Age by Sex and Stock*

The mean lengths of Chilkat Lake sockeye were greater than those of Chilkoot Lake and Berners Bay/Chilkat Mainstem fish from the same age group and sex in both catches and escapements ( $P < 0.01$ ; Table 8). Differences were greatest among age-2.2 fish: Chilkat Lake fish were 32 mm longer than Chilkoot fish in catches and 58 mm longer in escapements.

Age-3 Chilkoot fish sampled from catches were slightly smaller, 1-4 mm, than those sampled from escapements (Table 8). A much greater difference was observed among age-2 fish. Fish aged 1.2 were an average of 7 mm and fish aged 2.2 32 mm shorter in escapements than in catches. Males were larger in all age classes except 1.2 and 2.2.

On the average, Chilkat Lake fish sampled from escapements were slightly shorter in length compared to those sampled from catches (Table 8). Males in the catch were longer than those that escaped for the three major age classes; females were approximately the same length.

The length data for Berners Bay/Chilkat Mainstem was not adequate to make comparisons between average lengths in catches and escapements. Only a portion of the Chilkat Mainstem spawning grounds were sampled, and it may not have been representative. Within Berners Bay the longest age-1.3 fish came

## *Migratory Timing and Dispersion*

### **Catch**

The MDH of Berners Bay/Chilkat Mainstem fish, 15 July, was earliest, followed by Chilkoot Lake, 29 July, and Chilkat Lake, 2 August (Table 9).

In the Chilkoot Lake harvest, little difference in timing was seen between age classes (Table 9). The MDH of the earliest age class, 1.3, of 27 July was only 5 d earlier than that for age-2.3 fish, the latest to arrive. Approximately 63% of the harvest occurred during 4 weeks, 16 July to 12 August. Age-2.3 fish exhibited the most dispersed harvest as indicated by a standard error (SE) of 2.5 weeks; fish aged 1.2 were the least dispersed with a SE of 1.9 weeks.

The MDHs for major age classes in the Chilkat Lake harvest indicated that fish aged 1.3 migrated earliest (MDH = 20 July), and fish aged 2.3 (5 August) and 2.2 (15 August) arrived much later (Table 9). The central 50% of the run was harvested during the period 16 July to 12 August. The harvest of age-2.3 fish was the most dispersed, SE=3.2 weeks, and fish aged 2.2 were the least, SE=1.8 weeks.

Age-1.3 fish from Berners Bay/Chilkat Mainstem were harvested earlier in the season, MDH = 7 July, than age-0.3 fish, MDH = 27 July. Age-0.3 fish in this group originate primarily from the Chilkat River Mainstem; timing for these stocks is later than stocks from Berners Bay, which were mostly age-1.3 fish in 1989.

### **Escapement**

The mean dates of escapement (MDE) for Chilkoot Lake and Chilkat Lake exhibited trends similar to those observed in the catch (Table 9). The overall MDE for Chilkoot Lake was much earlier, 15 July, compared to that for Chilkat Lake, 22 August. Age-1.3 fish arrived earliest at Chilkoot Lake weir, MDE= 10 July; the MDE for fish aged 2.3 was 10 d later for age-1.2 fish 3.5 weeks later, MDE = 3 August. Fish aged 1.3 were again most dispersed, SE = 4.6 weeks. At Chilkat Lake weir, fish aged 1.3 exhibited the earliest MDE, 29 July, followed by fish aged 2.3 (18 August), 1.2 (24 August), and 2.2 (18 September). Fish aged 2.3 were the most dispersed, SE = 5.1 weeks.

## *Historical Database*

The total season catch, escapement, total run, and exploitation by run are presented in Table 4. Catches in Lynn Canal are shown from 1960 to 1989. Catches, escapements, total runs, and exploitation rates for Chilkoot and Chilkat Lake are presented from 1976 to 1989. Catches are shown for Berners Bay/Chilkat Mainstem from 1976 to 1989; escapements for this stock were not entirely enumerated and are not presented. Catches for this period were composed of a majority of Chilkoot Lake fish (53%) and Chilkat Lake fish (44%). Total runs, i.e., catch plus escapement, averaged 231,513 fish to Chilkoot Lake and 173,133 to Chilkat Lake. In 1989 the total run of 346,763 Chilkoot Lake sockeye salmon was the second largest on record for that lake. The 1989 Chilkat total run of 299,921 fish was the largest on record for that lake and 73% above average. Runs to Chilkoot Lake have been larger from 1982 to 1989 than from 1976 to 1981, but the same is not true for Chilkat Lake. The total run to Lynn Canal, all stocks combined, has averaged approximately 413,000 from 1976 to 1989; the smallest total run, 211,462 fish,

was observed in 1978 and the largest, 667,309 fish, in 1989. Average exploitation from 1976 to 1989 of the Lynn Canal total run has been 58%, but has been higher than that level in all years since 1982 because runs have been larger.

Age-1.3 fish have been the single largest age class in the Chilkoot Lake total run every year since 1976, averaging 68% of the total annual run (Table 10). Most of the remainder was age-2.3 fish, but age-1.2 fish contributed more than 10% in some years prior to 1983. On average, from 1976 to 1989, age-1. fish composed 77% of the total Chilkoot Lake run. Exploitation by age class revealed that age-2 fish, primarily ages 1.2 and 2.2, 45%, than age-3 fish, aged 1.3 and 2.3, 64%.

The age composition of Chilkat Lake sockeye salmon was dominated by age-2.2 or age-2.3 fish each year except 1989 when age-1.3 fish were the single most abundant age class and composing 38% of the run (Table 11). On the average, age-2.3 fish were 38% and age-2.2 fish 37% of the run. Age-1.3 fish composed an average of 21% of the run. The Chilkat Lake run was composed of an average of 75% age-2. fish, in direct contrast to the Chilkoot Lake run that was 77% age 1.. Exploitation of the Chilkat run has averaged 55% compared to 62% for Chilkoot Lake. Exploitation by age for the Chilkat Lake fish indicates that age-2 fish were exploited less than age-3 fish, but the difference was less than that seen among Chilkoot Lake fish. This was true because age-2 Chilkoot Lake fish were smaller than the age-2 Chilkat Lake fish (Table 7) and gillnets used in the fishery selectively harvest larger fish, allowing smaller fish to escape.

Brood year returns for Chilkoot Lake are shown in Table 12 for the parent escapements from 1976 to 1984; the average has been 288,742 fish, representing a total return-per-spawner (TR/S) ratio of 3.7:1. Escapements averaged approximately 85,000 fish for those broods. The largest return was 419,345 from the 1983 escapement of 80,343 fish, although the highest return per spawner, 7.9, was from the 1978 escapement of 35,452. Returns from unenumerated escapements from 1971 to 1975 were poor except for the 1972 brood. The return by age class indicated that the return was composed of 74% age-1.3 fish on average. Chilkoot Lake was dominated by age-1. fish; however, the relatively large contributions of age-2.3 fish in the brood year returns for 1977, 1981, and 1983 indicated that escapements above 95,000 may have been causing holdover.

Brood year returns for Chilkat Lake indicate that this system was less productive than Chilkoot Lake (Table 13). Brood year returns from 1971 to 1984 averaged 178,814 fish, and the TR/S averaged 2.6:1. It is surprising that Chilkat Lake has been less productive because its primary productivity levels are greater (Barto and Koenings *in press*), i.e., it is 6-8°C warmer in the summer, and is a relatively clear lake, whereas Chilkoot Lake is glacially silted. Additionally, Chilkat Lake is dominated by age-2. fish. This occurs because spawning lasts from July until the following February (Fred Bergander, ADF&G, Commercial Fisheries Division and Brad Sele, ADF&G, F.R.E.D., personal communications), whereas in Chilkoot Lake spawning is generally finished by late September. The extended period for Chilkat Lake means that late spawning fish, which compose the majority of the escapement, emerge so late the following year that the fry do not grow enough that year to smolt as age-1. fish. McPherson (1989) presents further details.

## DISCUSSION

The visual classification technique used to determine stock groups in Lynn Canal has been successful this season for several reasons. First, all age classes were included; because all fish were classified to one of

three groups, a standard error estimate was possible for each groups' contributions. Second, high classification accuracies for all age classes meant that the inseason stock contribution estimates were similar to postseason estimates. Third, estimates of stock contribution from visual classification are more precise and less biased than those from analyses which rely upon a subset of scales that can be aged. Finally, the visual technique was cost effective and required less time than other methods which rely on scale pattern measurements generated from computers, genetic data, other biological markers, etc.

The visual classification technique has resulted in a database that has been used to build an information system which allows more effective management of Lynn Canal sockeye salmon (McPherson 1990). The spawner-recruit database shown in Tables 12 and 13 was used to refine escapement goals for the 1990 season. The temporal distribution of the historical total annual run for each stock was used to build models which forecast total annual run for each stock to within 25% or less, on average, by the time 25% of the run has been counted (McPherson 1990). This enables managers to calculate the exploitation rate and the temporal and spatial distribution of openings needed to meet escapement objectives.

In 1989 the escapement to Chilkoot Lake was approximately 5,000 below the lower objective, 60,000 fish, for that system; for Chilkat Lake the escapement was double the upper objective of 70,000 fish. These escapements were the result of several factors. First, both runs were large and early; approximately 25,000 sockeye from each lake migrated through the fishery area before the season started. Because of this, openings in July and early August were very aggressive in order to harvest the surplus. Second, beginning in early August, the duration and location of openings were limited to protect the Chilkoot run from over-exploitation and also after 1 September to protect the weak run of fall chum salmon to the Chilkat River. Consequently, the exploitation rate of the Chilkat run was low after early August, resulting in a large escapement to that lake.

Travel time to Chilkat Lake from the fishery was approximately 2 to 3 weeks during the season, judged from minimizing the differences in lateral age composition between the catch and escapement shown in Figures 6b and 8b. Large weekly escapements appeared at Chilkat Lake beginning in late August and continued until mid-September (Figure 7). The travel time, fishery to weir, was shorter than normal for Chilkat Lake. Travel time in most years for Chilkat Lake is 4-5 weeks early in the season and 3-4 weeks for the late stock age-2. fish. The reduced travel time was probably a combination of local conditions. Few flow reversals occurred in Chilkat Lake's outlet stream this season (Appendix C.1). Additionally, overall flow rates in the main body of the Chilkat River were good (Ray Staska, ADF&G, Commercial Fisheries Division, Haines, personal communication).

Residence time, i.e., migration rate through the fishery area, for the Chilkoot and Chilkat Lake runs in 1989 was unusual compared to 1981 through 1988. Chilkoot Lake fish moved more slowly through the fishery area. This was indicated by the continued high exploitation rate on Chilkoot Lake fish after conservation measures were enacted. The exploitation rate of 84% is the highest on record (Table 10). However, despite aggressive openings in July and early August, the exploitation rate on the Chilkat run was only 53%, the lowest since 1983 (Table 11). The residence time for this run was shorter than normal because the time and area openings were greater than normal during at least the central portion of the season. Wind may have been a factor in residence times for the two stocks. A lack of wind, especially from the southeast, was noted by fishermen and the management biologist (Ray Staska, ADF&G, Division of Commercial Fisheries, Haines, personal communication). Southeast wind is thought to cause Chilkat Lake fish to extend their migration path to Mud Bay. Site-specific scale sampling in 1989 (Appendix B.8) showed that few Chilkat Lake fish were present along the shoreline from Mud Bay to the east side of Point Seduction. Additionally, the steady outflow from Chilkat River may have combined with the lack of wind to enhance the migration rate of the Chilkat Lake fish.

The run timing of the overall Chilkoot and Chilkat Lake runs was earlier than average; timing of annual runs, catches, and escapements is summarized from 1976 to 1989 in McPherson (1990). Timing for both overall runs were approximately 7 d earlier than average and was the earliest for both lakes for the past 10 years. This, coupled with the fact that the Chilkat run was the largest and the Chilkoot run the second largest on record, meant that weekly catches early in the season were the largest on record, as was the total season catch.

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Table 1. Classification matrices for visual classification models of individual age classes of sockeye salmon stocks contributing to the Lynn Canal (District 115) drift gillnet fishery, 1989.

Model: Fish age-1.1

Actual Stock of Origin	Sample Size	Classified Group of Origin			
		Chilkoot	Chilkat	Berners/Mainstem	
Chilkoot	1	1.000			
Chilkat	11		1.000		
Berners/Mainstem	3			1.000	
Total	15	Overall Classification Accuracy =			1.00

Model: Fish age-1.2

Actual Stock of Origin	Sample Size	Classified Group of Origin			
		Chilkoot	Chilkat	Berners/Mainstem	
Chilkoot	55	1.000			
Chilkat	26		1.000		
Berners/Mainstem	19	0.053		0.947	
Total	100	Overall Classification Accuracy =			0.99

Model: Fish age-1.3

Actual Stock of Origin	Sample Size	Classified Group of Origin		
		Chilkoot	Chilkat	Berners/Mainstem
Chilkoot	102	0.980		0.020
Chilkat	87		0.954	0.046
Berners/Mainstem	111	0.045		0.955
Total	300	Overall Classification Accuracy = 0.96		

Model: Fish age-1.4

Actual Stock of Origin	Sample Size	Classified Group of Origin		
		Chilkoot	Chilkat	Berners/Mainstem
Chilkoot	31	0.968	0.032	
Chilkat	4		1.000	
Berners/Mainstem				
Total	35	Overall Classification Accuracy = 0.97		

-Continued-

Table 1 (page 2 of 2)

Model: Fish age-2.2

Actual Stock of Origin	Sample Size	Classified Group of Origin		
		Chilkoot	Chilkat	Berners/Mainstem
Chilkoot	48	0.979	0.021	
Chilkat	49		1.000	
Berners/Mainstem	3			1.000
Total	100	Overall Classification Accuracy =		0.99

Model: Fish age-2.3

Actual Stock of Origin	Sample Size	Classified Group of Origin		
		Chilkoot	Chilkat	Berners/Mainstem
Chilkoot	44	1.000		
Chilkat	48	0.042	0.958	
Berners/Mainstem	8			1.000
Total	100	Overall Classification Accuracy =		0.98

Model: Fish age-2.4

Actual Stock of Origin	Sample Size	Classified Group of Origin		
		Chilkoot	Chilkat	Berners/Mainstem
Chilkoot	8	1.000		
Chilkat	2		1.000	
Berners/Mainstem				
Total	10	Overall Classification Accuracy =		1.00

Model: Fish age-3.3

Actual Stock of Origin	Sample Size	Classified Group of Origin		
		Chilkoot	Chilkat	Berners/Mainstem
Chilkoot	8	1.000		
Chilkat	2		1.000	
Berners/Mainstem				
Total	10	Overall Classification Accuracy =		1.00

Table 2. Scale pattern measurements of age-1.3 sockeye salmon in escapements to Lynn Canal, 1989.

Variable	Stock	Mean	SE	Min	Max
1. Number of circuli in 1st freshwater year.	Chilkoot Lake	6.1	0.11	4	10
	Chilkat Lake	14.0	0.20	8	21
2. Size of 1st freshwater year.	Chilkoot Lake	64.6	1.09	44	105
	Chilkat Lake	176.0	2.23	97	256
3. Number of circuli in freshwater plus growth zone.	Chilkoot Lake	5.0	0.10	3	7
	Chilkat Lake	3.6	0.11	1	6
4. Size of freshwater plus growth zone.	Chilkoot Lake	48.1	1.00	24	72
	Chilkat Lake	38.7	1.31	9	72
5. Number of circuli in total freshwater growth zone.	Chilkoot Lake	11.1	0.12	9	14
	Chilkat Lake	17.5	0.20	12	24
6. Size of total freshwater growth zone.	Chilkoot Lake	112.7	1.27	87	146
	Chilkat Lake	214.7	2.16	143	283
7. Number of circuli in 1st marine year.	Chilkoot Lake	29.3	0.25	24	36
	Chilkat Lake	25.6	0.26	20	33
8. Size of 1st marine year.	Chilkoot Lake	438.2	3.80	361	535
	Chilkat Lake	377.6	3.78	276	460
Number of scales digitized.	Chilkoot Lake	99			
	Chilkat Lake	100			

Table 3. Comparison of inseason and postseason weekly stock proportions of sockeye scales sampled from Lynn Canal catches, 1989.

Statistical Week	Chilkoot		Chilkat		Berners/Mainstem	
	Inseason	Postseason	Inseason	Postseason	Inseason	Postseason
25	0.356	0.344	0.441	0.461	0.202	0.195
26	0.521	0.516	0.332	0.346	0.147	0.138
27	0.493	0.492	0.394	0.412	0.112	0.096
28	0.672	0.679	0.266	0.278	0.062	0.043
29	0.738	0.746	0.211	0.219	0.050	0.035
30	0.739	0.749	0.207	0.213	0.054	0.038
31	0.790	0.796	0.164	0.166	0.045	0.038
32	0.571	0.572	0.394	0.402	0.035	0.025
33	0.640	0.641	0.345	0.352	0.014	0.007
34	0.315	0.307	0.662	0.675	0.023	0.018
35	0.286	0.277	0.698	0.711	0.016	0.012
36	0.400	0.388	0.584	0.596	0.017	0.015
37	0.247	0.228	0.741	0.760	0.013	0.012
38	0.437	0.423	0.555	0.568	0.008	0.009
Total <sup>a</sup>	0.616	0.618	0.329	0.338	0.055	0.044

<sup>a</sup> Weighted by weekly catches.

Table 4. Catches, escapements, total runs, and exploitation rates of Lynn Canal (District 115) sockeye salmon stocks from 1960 to 1989.

Spawning Stock																	
Chilkat Lake						Chilkoot Lake					Berners Bay + Chilkat Mainstem		Lynn Canal Total				
Year	Catch	Esc.	Percent			Catch	Esc.	Percent			Percent		Catch	Esc.	Total Run	Expl. Rate	
			Total Run	Total Catch	Expl. Rate			Total Run	Total Catch	Expl. Rate	Total Catch	Total Catch					
1960																	59,604
1961																	67,860
1962																	103,696
1963																	57,518
1964																	68,200
1965																	89,046
1966																	108,087
1967		20,111	a														66,621
1968		41,246	a														80,004
1969		44,555	a														127,869
1970		41,085	a														79,115
1971		49,342															75,147
1972		51,850															81,010
1973		50,527															193,701
1974		82,811															152,015
1975		41,520															18,338
1976	59,328	69,729	129,057	0.47	0.46	62,452	71,297	133,749	0.49	0.47	4,842	0.04	126,622	141,026	267,648	0.47	
1977	41,389	41,044	82,433	0.26	0.50	113,313	97,051	210,364	0.71	0.54	5,377	0.03	160,079	138,095	298,174	0.54	
1978	89,558	67,528	157,086	0.83	0.57	14,264	35,454	49,718	0.13	0.29	4,658	0.04	108,480	102,982	211,462	0.51	
1979	115,994	80,589	196,583	0.60	0.59	69,864	95,946	165,810	0.36	0.42	7,116	0.04	192,974	176,535	369,509	0.52	
1980	30,681	95,347	126,028	0.58	0.24	20,846	96,512	117,358	0.39	0.18	1,558	0.03	53,085	191,859	244,944	0.22	
1981	48,460	84,089	132,549	0.52	0.37	43,792	83,372	127,164	0.47	0.34	1,071	0.01	b 93,323	167,461	260,784	0.36	
1982	127,036	80,221	207,257	0.46	0.61	144,592	102,973	247,565	0.53	0.58	1,908	0.01	b 273,536	183,194	456,730	0.60	
1983	123,888	134,207	258,095	0.34	0.48	241,469	80,343	321,812	0.65	0.75	3,955	0.01	b 369,312	214,550	583,862	0.63	
1984	98,233	115,269	213,502	0.29	0.46	231,792	100,417	332,209	0.69	0.70	4,348	0.01	b 334,373	215,686	550,059	0.61	
1985	148,590	57,724	206,314	0.46	0.72	155,773	69,026	224,799	0.49	0.69	16,178	0.05	320,541	126,750	447,291	0.72	
1986	168,361	23,947	192,308	0.58	0.88	110,430	88,024	198,454	0.38	0.56	11,414	0.04	290,205	111,971	402,176	0.72	
1987	70,069	48,593	118,662	0.17	0.59	334,995	95,185	430,180	0.81	0.78	10,751	0.03	415,815	143,778	559,593	0.74	
1988	76,473	27,593	104,066	0.22	0.73	253,968	81,274	335,242	0.72	0.76	21,110	0.06	351,551	108,867	460,418	0.76	
1989	159,446	140,475	299,921	0.34	0.53	291,863	54,900	346,763	0.62	0.84	20,625	0.04	471,934	195,375	667,309	0.71	
Averages:																	
1960-1975																	
1976-1979	76,567	64,723	141,290	0.54	0.53	64,973	74,937	139,910	0.42	0.43	5,498	0.04	89,239 147,039	139,660	286,698	0.51	
1980-1989	105,124	80,747	185,870	0.40	0.56	182,952	85,203	268,155	0.58	0.62	9,292	0.03	297,368	165,949	463,317	0.61	
1984-1988	120,195	68,934	189,129	0.34	0.65	229,804	81,471	311,275	0.62	0.72	14,071	0.04	364,070	150,405	514,474	0.71	
1960-1988																	
1976-1988	92,158	71,222	163,380	0.44	0.55	138,273	84,375	222,648	0.53	0.54	7,253	0.03	155,784 237,684	155,596	393,281	0.57	
Min	30,681	23,947	82,433	0.17	0.24	14,264	35,454	49,718	0.13	0.18	1,071	0.01	53,085	102,982	211,462	0.22	
Max	168,361	134,207	258,095	0.83	0.88	334,995	102,973	430,180	0.81	0.78	21,110	0.06	415,815	215,686	583,862	0.76	

a Escapement not enumerated for entire season.

b Catch broken out for age-0. fish only.

Table 5. Fishery openings, effort, harvest, and CPUE for sockeye salmon in Lynn Canal (District 115) by date and statistical week, 1989.

Stat. Week	Dates Fished	Hours open			Weekly District Maximum	Boats	Catch	CPUE Fish/ Boatday	Average Weight (kg)	Catch Dollar Value
		15A	15B	15C						
25	06/18-06/21	72	0	0	72	96	16,483	57	3.32	\$187,272
26	06/25-06/28	72	48	0	72	121	24,511	68	3.20	\$263,032
27	07/02-07/05	72	48	48	72	153	25,345	55	3.23	\$279,315
28	07/09-07/12	72	0	48	72	152	40,196	88	3.23	\$442,980
29	07/16-07/19	72	0	48	72	150	58,555	130	3.23	\$646,213
30	07/23-07/26	72	0	24	72	169	45,969	91	3.17	\$532,634
31	07/30-08/02	72	0	72	72	181	77,264	142	3.12	\$886,442
32	08/07-08/10	72	0	72	72	214	76,826	120	3.08	\$909,005
33	08/13-08/16	72	0	0	72	212	52,497	83	3.08	\$622,877
34	08/20-08/23	72	0	0	72	166	26,733	54	3.04	\$315,236
35	08/27-08/29	48	0	0	48	109	18,943	87	3.07	\$224,096
36	09/03-09/05	48	0	48	48	166	6,428	19	3.04	\$79,794
37	09/10-09/11	24	0	24	24	171	1,619	9	3.18	\$20,059
38	09/17-09/18	24	0	24	24	143	565	4	3.27	\$7,129
Total		864	96	408	864	265	471,934	1,007	3.14	\$5,429,034

Notes to openings:

Section 15-A

1. June 18-21: open south of the latitude of the southernmost tip of Talsani Island.
2. June 25-28: open in the waters of Lynn Canal south of the latitude of the southernmost tip of Talsani Island and in the waters of Chilkoot Inlet north of the latitude of Mud Bay Point (Flat Bay Point) through 12:00 noon, Wednesday, June 28; Lutak Inlet closed north and west of a point from 59°18'42" N. latitude, 132°29'48" W. longitude.
3. July 2-5 and 9-12: open with Lutak Inlet open to the mouth of the Chilkoot River and Chilkat Inlet and Lynn Canal closed within a line extending from Seduction Point to the northernmost tip of Talsani Island to the southernmost tip of Talsani Island and then due west to the western shore of Lynn Canal.
4. July 16-19: open with Lutak Inlet closed the same as on July 2-5 and Chilkat Inlet north of a line from the Glacier Point marker to the westernmost tip of Twin Coves at 59°06'35" N. latitude, 135°21'42" W. longitude.
5. July 23-26: open with Lutak Inlet closed the same as on July 2-5.
6. July 30-August 2: open with Lutak Inlet closed the same as on June 25-28.
7. August 7-10: open with Chilkat Inlet open to the mouth of the Chilkat River.

-Continued-



Table 5 (page 2 of 2)

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8. August 13-16: open with Chilkat Inlet closed the same as on August 7-10 and Chilkoot Inlet and Lutak Inlet closed north of the latitude of the southernmost tip of Mud Bay (Flat Bay) Point.
  9. August 20-23: open in the waters of Lynn Canal south of the latitude of the southernmost tip of Seduction Point through 12:00 noon August 22 and in the waters of Chilkat Inlet for the entire period with the waters of Chilkat Inlet closed the same as on August 13-16.
  10. August 27-29 and September 3-5: open north of the latitude of Sullivan Rock Light and west of a line from Sullivan Rock Light to Eldred Rock Light to the southernmost tip of Talsani Island to the northernmost tip of Talsani Island to the southernmost tip of Seduction Point; Chilkat Inlet closed the same as on July 16-19.
  11. September 10-11: open with the waters of Chilkat Inlet closed the same as on July 16-19 and the waters of Chilkoot Inlet closed north of the latitude of Seduction Point.
  12. September 17-18: open with the waters of Chilkat Inlet closed north of the latitude of the southernmost tip of Seduction Point and the waters of Chilkoot Inlet closed north of the latitude of the Katzechin River flats buoy.

Section 15-B

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1. June 18-20: open south of the latitude of the Point St. Mary.
2. July 9-11: open north of a line from a point on the eastern shore of Lynn Canal at the latitude of Vanderbilt Reef Light to Vanderbilt Reef Light to Little Island Light and then due west to the western shore of Lynn Canal with the Endicott River closed within one nautical mile of the river mouth.

Section 15-C

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1. July 2-4: open north of a line from a point on the eastern shore of Lynn Canal at the latitude of Vanderbilt Reef Light to Vanderbilt Reef Light to Little Island Light and then due west to the western shore of Lynn Canal.
  2. July 9-11: open north of a line from a point on the eastern shore of Lynn Canal at the latitude of Vanderbilt Reef Light to Vanderbilt Reef Light to Little Island Light and then due west to the western shore of Lynn Canal with the Endicott River closed within one nautical mile of the river mouth.
  3. July 16-18, 23-24; July 30-August 2; August 7-10: open north of a line from a point on the eastern shore of Lynn Canal at the latitude of Vanderbilt Reef Light to Vanderbilt Reef Light to Little Island Light and then due west to the western shore of Lynn Canal with the Endicott River closed the same as on July 9-11 and William Henry Bay closed within one-half nautical mile of the Beardslee River mouth.
  4. September 3-5 and 10-11: open in the entire section.
  5. September 17-18: open north of the latitude of Point Bridget.
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Table 6. Estimated contribution of sockeye salmon stocks to the Lynn Canal  
(District 115) drift gillnet fishery by statistical week, 1989.

Stat. Week		Chilkoot Lake	Chilkat Lake	Berners Bay + Chilkat Mainstem	Total
25	Catch	5,673	7,596	3,214	16,483
	Percent	34.4	46.1	19.5	100.0
	Std. Error	121	79	162	
26	Catch	12,640	8,490	3,381	24,511
	Percent	51.6	34.6	13.8	100.0
	Std. Error	584	556	434	
27	Catch	12,466	10,439	2,440	25,345
	Percent	49.2	41.2	9.6	100.0
	Std. Error	633	639	467	
28	Catch	27,293	11,161	1,742	40,196
	Percent	67.9	27.8	4.3	100.0
	Std. Error	887	843	578	
29	Catch	43,692	12,833	2,030	58,555
	Percent	74.6	21.9	3.5	100.0
	Std. Error	1,218	1,092	736	
30	Catch	34,439	9,805	1,725	45,969
	Percent	74.9	21.3	3.8	100.0
	Std. Error	832	727	540	
31	Catch	61,509	12,833	2,922	77,264
	Percent	79.6	16.6	3.8	100.0
	Std. Error	1,361	1,266	643	
32	Catch	43,957	30,913	1,956	76,826
	Percent	57.2	40.2	2.5	100.0
	Std. Error	1,667	1,613	389	
33	Catch	33,639	18,492	366	52,497
	Percent	64.1	35.2	0.7	100.0
	Std. Error	1,141	1,109	356	
34	Catch	8,205	18,034	494	26,733
	Percent	30.7	67.5	1.8	100.0
	Std. Error	576	583	93	
35	Catch	5,245	13,465	233	18,943
	Percent	27.7	71.1	1.2	100.0
	Std. Error	420	424	76	
36	Catch	2,497	3,833	98	6,428
	Percent	38.8	59.6	1.5	100.0
	Std. Error	161	170	38	
37	Catch	369	1,231	19	1,619
	Percent	22.8	76.0	1.2	100.0
	Std. Error	51	51	12	
38	Catch	239	321	5	565
	Percent	42.3	56.8	0.9	100.0
	Std. Error	27	27	5	
Total	Catch	291,863	159,446	20,625	471,934
	Percent	61.8	33.8	4.4	100.0
	Std. Error	3,192	3,023	1,518	

Table 7. Catch, escapement, total run, and exploitation rates of Lynn Canal (District 115) sockeye salmon by age class and system, 1989.

System		Brood Year and Age Class													Total	
		1986		1985			1984			1983			1982			1981
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3		4.3
Chilkoot Lake																
Catch	Number		62		10,709			167,265	12,868	595	98,209		202	1,953		291,863
	Percent		<0.1		3.7			57.3	4.4	0.2	33.6		0.1	0.7		100.0
Escapement	Number				1,786			30,704	2,270	654	18,909		253	324		54,900
	Percent				3.3			55.9	4.1	1.2	34.4		0.5	0.6		100.0
Total Run	Number		62		12,495			197,969	15,138	1,249	117,118		455	2,277		346,763
	Percent		<0.1		3.6			57.1	4.4	0.4	33.8		0.1	0.7		100.0
Expl. Rate			1.00		0.86			0.84	0.85	0.48	0.84		0.44	0.86		0.84
Chilkat Lake																
Catch	Number		132		680	38		60,151	47,493		50,902	5		45		159,446
	Percent		0.1		0.4	<0.1		37.7	29.8		31.9	<0.1		<0.1		100.0
Escapement	Number				1,091			52,869	47,578	130	38,540	58		139	70	140,475
	Percent				0.8			37.6	33.9	0.1	27.4	<0.1		0.1	<0.1	100.0
Total Run	Number		132		1,771	38		113,020	95,071	130	89,442	63		184	70	299,921
	Percent		<0.1		0.6	<0.1		37.7	31.7	<0.1	29.8	<0.1		0.1	<0.1	100.0
Expl. Rate			1.00		0.38	1.00		0.53	0.50		0.57	0.08		0.24		0.53
Berners Bay/ Chilkat Mainstem																
Catch	Number	110		8,550	903		44	10,637	261	56	64					20,625
	Percent	0.5		41.5	4.4		0.2	51.6	1.3	0.3	0.3					100.0
Berners Bay Escapement	Percent	1.8	1.1	2.1	6.7	0.4		85.3	0.7		2.1					100.0
	Peak Number <sup>a</sup>															1,732
Chilkat Mainstem Escapement	Percent	8.0		56.8	2.3			31.8			1.1					100.0
	Peak Number <sup>b</sup>															715

<sup>a</sup> Peak escapement count, not total enumeration. A total of 750 sockeye were counted in the Berners River and 850 in the Lacey on 8/2/89 and 132 in the Antler-Bilkey River on 8/10/89.

<sup>b</sup> Peak escapement count, not total enumeration. A total of 50 sockeye were counted in Mosquito Lake (9/19), 400 in the Tsirku River Delta (10/14), 15 in the Mule Meadows area (9/19), and 250 in the Tahini River (early August).

Table 8. Average length (mm) of sockeye salmon catches and escapements in Lynn Canal by sex, age class, and stock, 1989.

		Brood Year and Age Class														Total
		1986		1985			1984			1983			1982		1981	
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3	4.3	
Chilkat Lake - District 115 Catch																
Male	Avg. Length		370					612	555		609					589
	Std. Error							3.0	3.0		2.9					2.3
	Sample Size		1					128	123		104					356
Female	Avg. Length				509	350		587	546		587					572
	Std. Error				18.8			2.1	1.7		2.0					1.6
	Sample Size				4	1		142	146		169					462
All Fish	Avg. Length		370		509	350		602	550		594					579
	Std. Error				18.8			1.9	1.7		1.8					1.4
	Sample Size		1		4	1		270	269		273					818
Chilkat Lake - Escapement																
Male	Avg. Length				539			605	544	589	604	480		530		583
	Std. Error				9.4			1.2	1.2	30.0	1.8					1.0
	Sample Size				22			1,050	574	2	526	1		1		2,176
Female	Avg. Length				530			588	547	579	585			620	600	572
	Std. Error				20.0			1.0	1.0	35.0	1.1					0.8
	Sample Size				6			607	524	2	526			1	1	1,667
All Fish	Avg. Length				539			597	544	574	593	480		575	600	578
	Std. Error				8.3			0.8	0.8	19.7	1.1			45.0		0.7
	Sample Size				28			1,657	1,119	4	1,058	1		2	1	3,870
Chilkoot Lake - Distict 115 Catch																
Male	Avg. Length				497			592	523	632	588		648	567		581
	Std. Error				10.8			1.8	5.0	10.0	2.0			2.9		1.7
	Sample Size				19			277	32	2	186		1	3		520
Female	Avg. Length				489			577	519		576			572		571
	Std. Error				11.4			1.1	9.7		1.3			4.9		1.2
	Sample Size				17			330	21		233			5		606
All Fish	Avg. Length				497			584	518	632	581		648	571		576
	Std. Error				7.8			1.1	4.8	10.0	1.2			3.1		1.0
	Sample Size				36			607	53	2	419		1	8		1,126
Escapement																
Male	Avg. Length				486			591	483	612	588		592	600		579
	Std. Error				3.7			0.8	5.0	6.0	1.2		13.6	12.7		1.2
	Sample Size				89			810	84	22	451		6	5		1467
Female	Avg. Length				489			569	496	603	565		594	566		565
	Std. Error				4.3			0.9	4.3	7.4	1.2		14.7	5.1		0.9
	Sample Size				27			608	46	9	414		4	9		1,117
All Fish	Avg. Length				490			581	486	607	577		592	570		573
	Std. Error				3.2			0.7	3.6	4.8	0.9		9.6	6.1		0.8
	Sample Size				116			1,418	130	31	865		10	14		2,584

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Table 8 (page 2 of 3)

		Brood Year and Age Class														Total
		1986		1985			1984			1983			1982		1981	
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3	4.3	
Berners Bay/Chilkat Mainstem - District 115 Catch																
Male	Avg. Length			583	509		655	596	450							586
	Std. Error			9.9	17.4			3.5								4.6
	Sample Size			14	4		1	59	1							79
Female	Avg. Length			580				578								580
	Std. Error			6.2				3.3								2.9
	Sample Size			13				49								62
All Fish	Avg. Length			576	509		655	588	450							584
	Std. Error			5.8	17.4			2.6								2.9
	Sample Size			27	4		1	108	1							141
Berners, Lace, and Antler/Gilkey River Escapements - samples combined																
Male	Avg. Length	470	332		458	320		605	468		570					573
	Std. Error	17.6	6.0		5.9			2.4	12.5							6.0
	Sample Size	5	3		18	1		117	2		1					147
Female	Avg. Length			568	505			573			560					572
	Std. Error			11.5				2.2			19.7					2.3
	Sample Size			6	1			125			5					137
All Fish	Avg. Length	470	332	568	460	320		589	468		562					573
	Std. Error	17.6	6.0	11.5	6.1			1.9	12.5		16.2					3.3
	Sample Size	5	3	6	19	1		242	2		6					284
Samples by river																
Berners River escapement																
Male	(N=18)		338		452			600								546
Female	(N=17)							563			518					558
All Fish	(N=35)		338		452			580			518					552
Lace River escapement																
Male	(N=102)	470	320		460	320		607	468		570					573
Female	(N=110)			568	505			575			598					575
All Fish	(N=212)	470	320	568	464	320		589	468		588					574
Antler/Gilkey Rivers escapement																
Male	(N=27)				448			604								592
Female	(N=10)							567			570					567
All Fish	(N=37)				448			594			570					585

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Table 8 (page 3 of 3)

		Brood Year and Age Class														
		1986		1985			1984			1983			1982		1981	
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3	4.3	Total
Chilkat River Mainstem and Tahini River Escapements - samples combined																
Male	Avg. Length	443		575	420			605								550
	Std. Error	13.7		6.4				10.2								10.5
	Sample Size	7		27	2			6								42
Female	Avg. Length			548				559								552
	Std. Error			5.9				13.4								5.7
	Sample Size			13				6								19
All Fish	Avg. Length	443		567	420			582								551
	Std. Error	13.7		5.1				10.6								7.4
	Sample Size	7		40	2			12								61
Samples by river																
Chilkat River Mainstem																
Male	(N=42)	443		575	420			605								550
Female	(N=19)			548				559								552
All Fish	(N=61)	443		567	420			582								551
Tahini River																
Male	(N=91)	440		610	462			614	430		650					600
Female	(N=16)							583								583
All Fish	(N=107)	440		610	462			609	430		650					598

Table 9. Cumulative migratory time densities, mean dates of arrival, and variance for major age classes of Lynn Canal sockeye salmon stocks, 1989.

Catches in District 115													
		Stock Group and Age Class											
Statistical Week	Dates	Chilkoot Lake				Chilkat Lake					Berners/Mainstem		
		1.2	1.3	2.3	Total	1.2	1.3	2.2	2.3	Total	0.3	1.3	Total
25	6/18-6/24	0.004	0.015	0.031	0.019	0.000	0.074	0.001	0.061	0.048	0.031	0.265	0.156
26	6/25-7/01	0.021	0.058	0.078	0.063	0.000	0.153	0.006	0.130	0.101	0.081	0.518	0.320
27	7/02-7/08	0.057	0.105	0.117	0.105	0.000	0.280	0.014	0.177	0.166	0.101	0.710	0.438
28	7/09-7/15	0.177	0.227	0.167	0.199	0.112	0.429	0.018	0.214	0.236	0.190	0.781	0.523
29	7/16-7/22	0.320	0.395	0.288	0.349	0.274	0.578	0.048	0.261	0.317	0.330	0.848	0.621
30	7/23-7/29	0.464	0.532	0.374	0.467	0.274	0.691	0.070	0.299	0.378	0.489	0.871	0.705
31	7/30-8/05	0.750	0.753	0.548	0.677	0.274	0.775	0.167	0.362	0.459	0.831	0.871	0.846
32	8/06-8/12	0.857	0.888	0.733	0.828	0.841	0.907	0.411	0.578	0.653	0.937	0.945	0.941
33	8/13-8/19	0.971	0.972	0.896	0.943	0.841	0.949	0.598	0.715	0.769	0.970	0.952	0.959
34	8/20-8/26	0.980	0.986	0.946	0.971	0.979	0.983	0.797	0.842	0.882	0.981	0.985	0.983
35	8/27-9/02	0.991	0.996	0.978	0.989	0.979	0.997	0.951	0.943	0.966	0.998	0.993	0.994
36	9/03-9/09	0.998	0.999	0.996	0.998	1.000	1.000	0.987	0.983	0.990	1.000	0.998	0.999
37	9/10-9/16	0.999	1.000	0.999	0.999	1.000	1.000	0.997	0.996	0.998	1.000	1.000	1.000
38	9/17-10/23	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Mean Stat. Week		30.4	30.1	30.8	30.4	31.4	29.2	32.9	31.4	31.0	30.1	27.3	28.5
Mean Calendar Date		7/29	7/27	8/01	7/29	8/05	7/20	8/15	8/05	8/02	7/27	7/07	7/15
Std. Error		1.92	2.07	2.52	2.26	1.95	2.52	1.84	3.20	3.02	2.00	2.57	2.72
Coefficient of Variation		6.30	6.88	8.15	7.43	6.20	8.62	5.58	10.17	9.72	6.64	9.43	9.54

#### Escapements

Stock Group and Age Class												
Mid-week Date	Stat. Week	Chilkoot Lake				Period Dates	Stat. Week	Chilkat Lake				
		1.2	1.3	2.3	Total			1.2	1.3	2.2	2.3	Total
6/13	23.9	0.000	0.104	0.075	0.088	6/15	24.2	0.005	0.011	0.000	0.004	0.005
6/22	25.1	0.104	0.533	0.443	0.476	6/24	25.4	0.023	0.092	0.001	0.041	0.047
6/29	26.2	0.130	0.601	0.509	0.539	6/28	26.0	0.023	0.218	0.005	0.141	0.123
7/17	28.7	0.236	0.665	0.545	0.595	7/07	27.3	0.124	0.323	0.008	0.252	0.195
7/26	30.0	0.420	0.719	0.576	0.648	7/20	29.2	0.216	0.422	0.013	0.319	0.253
8/01	30.9	0.548	0.791	0.625	0.714	7/27	30.2	0.283	0.688	0.020	0.434	0.388
8/11	32.3	0.787	0.897	0.733	0.832	8/17	33.1	0.413	0.787	0.033	0.475	0.442
8/22	33.9	0.854	0.939	0.798	0.883	9/09	36.4	0.839	0.942	0.315	0.704	0.662
8/30	35.0	0.897	0.973	0.887	0.939	9/19	37.9	0.966	0.994	0.806	0.904	0.905
9/12	36.8	1.000	1.000	1.000	1.000	10/11	41.0	1.000	1.000	1.000	1.000	1.000
Mean Stat. Week		31.1	27.7	29.2	28.5			34.1	30.5	37.8	33.3	33.8
Mean Calendar Date		8/03	7/10	7/20	7/15			8/24	7/29	9/18	8/18	8/22
Std. Error		3.17	3.68	4.59	4.12			3.95	3.99	2.15	5.13	4.96
Coefficient of Variation		10.21	13.26	15.72	14.46			11.59	13.08	5.70	15.41	14.67

Table 10. Age composition of sockeye salmon in the Chilkoot Lake total run from 1976 to 1989.

## Part A - In Numbers of Fish

Year	Age Class										Total	By Freshwater Age Class		
	1.1	1.2	2.1	1.3	2.2	1.4	2.3	3.2	2.4	3.3		1.	2.	3.
1976	760	30,332		48,038	9,799		44,820				133,749	79,130	54,619	
1977		8,149		154,743	6,066	267	41,139				210,364	163,159	47,205	
1978		6,167		30,258	2,269	78	10,946				49,718	36,503	13,215	
1979		37,827		92,557	7,413		27,925	88			165,810	130,384	35,338	88
1980		8,933		68,923	9,523	25	29,641	313			117,358	77,881	39,164	313
1981	24	9,556		96,992	2,870	270	17,380		22	50	127,164	106,842	20,272	50
1982		30,050		200,862	2,024	1,420	13,097	4			247,565	232,332	15,121	112
1983	89	16,866	45	223,061	1,981	980	78,744		46	108	321,812	240,996	80,816	
1984		10,044		297,669	6,59	1,403	22,295		139		352,209	309,116	23,093	
1985	196	17,011	7	169,248	3,154	4,342	30,390	56			224,799	190,797	33,916	86
1986	43	18,293		145,214	3,452	1,016	29,935		325	176	198,454	164,566	33,712	176
1987	27	27,150		290,688	4,574	684	106,465		300	292	430,180	318,549	111,339	292
1988		22,288	34	263,218	10,567	2,034	36,382		667	52	335,242	287,540	47,650	52
1989	62	12,495		197,969	15,138	1,249	117,118		455	2,277	346,763	211,775	132,711	2,277
Average	86	18,226	6	162,817	5,678	983	43,306	33	166	213	231,513	182,112	49,155	246

## Part B - Percent of Total

1976	0.6	22.7		35.9	7.3		33.5				100.0	59.2	40.8	
1977		3.9		73.6	2.9	0.1	19.6				100.0	77.6	22.4	
1978		12.4		60.9	4.6	0.2	22.0				100.0	73.4	26.6	
1979		22.8		55.8	4.5		16.8	0.1			100.0	78.6	21.3	0.1
1980		7.6		58.7	8.1		25.3	0.3			100.0	66.4	33.4	0.3
1981		7.5		76.3	2.3	0.2	13.7				100.0	84.0	15.9	
1982		12.1		81.1	0.8	0.6	5.3				100.0	93.8	6.1	
1983		3.2		69.3	0.6	0.3	24.5				100.0	74.9	25.1	
1984		3.0		89.6	0.2	0.4	6.7				100.0	93.0	7.0	
1985	0.1	7.6		75.3	1.4	1.9	13.5		0.2		100.0	84.9	15.1	
1986		9.2		73.2	1.7	0.5	15.1		0.2	0.1	100.0	82.9	17.0	0.1
1987		6.3		67.6	1.1	0.2	24.7		0.1	0.1	100.0	74.1	25.9	0.1
1988		6.6		78.5	3.2	0.6	10.9		0.2		100.0	85.8	14.2	
1989		3.6		57.1	4.4	0.4	33.8		0.1	0.7	100.0	61.1	38.3	0.7
Average	0.1	9.3		68.1	3.1	0.4	18.9		0.1	0.1	100.0	77.8	22.1	0.1

## Part C - Exploitation Rates by Age Class

1976		0.27		0.44	0.33		0.67				0.47	0.37	0.61	
1977		0.32		0.57	0.28	0.42	0.49				0.54	0.56	0.47	
1978		0.36		0.28	0.14	1.00	0.30				0.29	0.29	0.27	
1979		0.23		0.51	0.19		0.45	0.22			0.42	0.43	0.40	0.22
1980		0.08		0.21	0.05	0.12	0.18	0.06			0.18	0.19	0.15	0.06
1981		0.10		0.40	0.06	0.27	0.20		1.00	1.00	0.34	0.38	0.18	1.00
1982		0.35		0.60	0.75	0.31	0.93	1.00		1.00	0.58	0.56	0.91	1.00
1983		0.42		0.78	0.36	0.75	0.74		1.00		0.75	0.76	0.73	
1984		0.53		0.71	0.48	0.30	0.62		1.00		0.70	0.70	0.62	
1985	0.76	0.51	1.00	0.73	0.44	0.62	0.64	0.18	0.39	1.00	0.69	0.71	0.62	0.47
1986		0.38		0.59	0.39	0.51	0.51		0.68	0.69	0.56	0.57	0.50	0.69
1987	1.00	0.71		0.78	0.54	0.60	0.79		0.53	0.75	0.78	0.78	0.78	0.75
1988		0.85	1.00	0.76	0.80	0.47	0.70		0.57		0.76	0.76	0.72	0.00
1989	1.00	0.86		0.84	0.85	0.48	0.84		0.44	0.86	0.84	0.84	0.84	0.86
Average	0.20	0.46	0.14	0.64	0.43	0.47	0.63	0.10	0.47	0.38	0.62	0.62	0.61	0.36



Table 11. Age composition of sockeye salmon in the Chilkat Lake total run from 1976 to 1989.

## Part A - In Numbers of Fish

Year	Age Class												Total	By Freshwater Age Class		
	1.1	0.3	1.2	2.1	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3		1.	2.	3.
1976	175		5,743	1,050	21,178	65,584			34,535	656		136	129,057	27,096	101,169	792
1977			2,793		19,708	41,592			18,340				82,433	22,501	59,932	
1978			9,715		16,232	84,795			45,651	693			157,086	25,947	130,446	693
1979			3,975		55,523	98,469			37,782	165		669	196,583	59,498	136,251	834
1980			3,053		9,184	68,309			35,322	10,160			126,028	12,237	103,631	10,160
1981			1,717	83	21,729	50,546		56	57,075	933		390	132,549	23,502	107,724	1,323
1982	220		3,503	1,550	32,174	69,986			97,129	1,799		896	207,257	35,897	168,665	2,695
1983	967		6,720	4,478	73,011	69,181		95	103,005	435	23	180	258,095	80,793	176,687	615
1984	134	41	2,438	1,756	68,712	88,155		117	51,630	295	83	141	213,502	71,401	141,624	436
1985	444		1,124	2,229	28,755	52,774	125	666	119,535	582	57	23	206,314	30,989	174,595	730
1986			4,206	470	13,851	56,490		22	114,318	2,487	79	385	192,308	18,079	171,357	2,872
1987	711		1,691	1,555	35,487	36,351		27	41,795	645	95	305	118,662	37,916	79,796	950
1988			2,271	21	30,616	15,776		125	54,702	258	40	240	104,066	33,012	70,539	498
1989	132		1,771	38	113,020	95,071		130	89,442	63		254	299,921	115,053	184,551	317
Average	199	3	3,623	945	38,513	63,791	9	88	64,304	1,369	28	259	173,133	42,423	129,069	1,637

## Part B - Percent of Total

1976	0.1		4.4	0.8	16.4	50.8			26.8	0.5		0.1	100.0	21.0	78.4	0.6
1977			3.4		23.9	50.5			22.2				100.0	27.3	72.7	
1978			6.2		10.3	54.0			29.1	0.4			100.0	16.5	83.0	0.4
1979			2.0		28.2	50.1			19.2	0.1		0.3	100.0	30.3	69.3	0.4
1980			2.4		7.3	54.2			28.0	8.1			100.0	9.7	82.2	8.1
1981			1.3	0.1	16.4	38.1			43.1	0.7		0.3	100.0	17.7	81.3	1.0
1982	0.1		1.7	0.7	15.5	33.8			46.9	0.9		0.4	100.0	17.3	81.4	1.3
1983	0.4		2.6	1.7	28.3	26.8		0.1	39.9	0.2		0.1	100.0	31.3	68.5	0.2
1984	0.1		1.1	0.8	32.2	41.3		0.1	24.2	0.1		0.1	100.0	33.4	66.3	0.2
1985	0.2		0.5	1.1	13.9	25.6	0.1	0.3	57.9	0.3			100.0	15.0	84.6	0.4
1986			2.2	0.2	7.2	29.4			59.4	1.3		0.2	100.0	9.4	89.1	1.5
1987	0.6		1.4	1.3	29.9	30.6			35.2	0.5	0.1	0.3	100.0	32.0	67.2	0.8
1988			2.2		29.4	15.2		0.1	52.6	0.2		0.2	100.0	31.7	67.8	0.5
1989			0.6		37.7	31.7			29.8			0.1	100.0	38.4	61.5	0.1
Average	0.1		2.3	0.5	21.2	38.0			36.7	1.0		0.1	100.0	23.6	75.2	1.1

## Part C - Exploitation Rates by Age Class

1976			0.47		0.32	0.53			0.42	0.47		1.00	0.46	0.35	0.49	0.56
1977			0.47		0.60	0.43			0.58				0.50	0.58	0.47	
1978			0.33		0.29	0.61			0.64	0.65			0.57	0.31	0.62	0.65
1979			0.89		0.46	0.72			0.39	1.00		0.92	0.59	0.49	0.63	0.93
1980			0.23		0.14	0.22			0.32	0.23			0.24	0.16	0.25	0.23
1981			0.82	1.00	0.53	0.22			0.42	0.09	1.00	1.00	0.37	0.55	0.33	0.36
1982			0.54		0.76	0.45			0.71	0.20		0.29	0.61	0.73	0.59	0.23
1983	0.10		0.44		0.41	0.37		0.76	0.63	0.45		0.68	0.48	0.41	0.51	0.52
1984			0.23		0.62	0.30		0.40	0.55	0.16	0.57	0.64	0.46	0.61	0.39	0.31
1985			0.62	0.10	0.78	0.58	0.23	0.76	0.79	0.63	1.00	1.00	0.72	0.76	0.71	0.57
1986			0.60		0.94	0.90		1.00	0.87	0.85	1.00	0.67	0.88	0.86	0.88	0.82
1987			0.46		0.67	0.52		1.00	0.62	0.45	0.98	0.79	0.59	0.65	0.56	0.56
1988			0.94	1.00	0.76	0.79		0.83	0.70	0.78	0.85	0.85	0.73	0.77	0.72	0.81
1989	1.00		0.38	1.00	0.53	0.50			0.57	0.08		0.18	0.53	0.53	0.53	0.16
Average	0.08		0.53	0.22	0.56	0.51	0.02	0.34	0.59	0.43	0.39	0.57	0.55	0.55	0.55	0.48

Table 12. Brood year returns and return per spawner of Chilkoot Lake sockeye salmon for parent years 1976 to 1984.

Part A - Numbers of Fish by Age Class

Brood Year	Escapement	3-Year			4-Year		5-Year		6-Year			7-Year		Total	Total Return Spawner
		1.1	1.2	2.1	1.3	2.2	1.4	2.3	3.2	2.4	3.3				
1971	a				48,038	9,799	267	41,139						99,243	
1972	a		30,332		154,743	6,066	78	10,946						202,165	
1973	a	760	8,149		30,258	2,269		27,925	88					69,449	
1974	a		6,167		92,557	7,413	25	29,641	313	22	50			136,188	
1975	a		37,827		68,923	9,523	270	17,380			108			134,031	
1976	71,294		8,933		96,992	2,870	1,420	13,097	4	46				123,362	1.7
1977	97,215		9,556		200,862	2,024	980	78,744		139				292,305	3.0
1978	35,452	24	30,050		223,061	1,981	1,403	22,295		365	30			279,209	7.9
1979	95,948		16,866	45	297,669	659	4,342	30,390	56	325	176			350,528	3.7
1980	96,217	89	10,044		169,248	3,154	1,016	29,935		300	292			214,078	2.2
1981	83,372		17,011	7	145,214	3,452	684	106,465		667	52			273,552	3.3
1982	102,973	196	18,293		290,688	4,574	2,034	36,382		455	2,277			354,899	3.4
1983	80,343	43	27,150		263,218	10,567	1,249	117,118	b					419,345	5.2
1984	100,417	27	22,288	34	197,969	15,138	1,641	54,303	b					291,400	2.9
1985	69,026		12,495												
1986	88,124	62													
1987	95,372														
1988	81,274														
1989	54,900														
Mean 76-84	84,803	42	17,799	10	209,436	4,935	1,641	54,303	8	328	404	288,742		3.70	
SD 76-84	21,279	68	7,633	17	67,132	4,758	1,162	40,485	28	201	920	85,526		1.84	
Min 76-84	35,452	24	8,933	7	96,992	659	684	13,097	4	46	30	123,362		1.73	
Max 76-84	102,973	196	30,050	45	297,669	15,138	4,342	117,118	56	667	2,277	419,345		7.88	
CV 76-84	0.25	1.62	0.43	1.77	0.32	0.96	0.71	0.75	3.71	0.61	2.28	0.30		0.50	
Mean 77-84	86,492	47	18,907	11	223,491	5,194	1,673	60,190	8	375	471	309,415		3.95	
SD 77-84	22,094	69	7,345	17	55,843	5,018	1,251	39,860		174	930	62,961		1.80	
CV 77-84	0.26	1.45	0.39	1.59	0.25	0.97	0.75	0.66		0.46	1.97	0.20		0.46	

Part B - Brood Year Return Percent by Age Class

Year	1.1	1.2	2.1	1.3	2.2	1.4	2.3	3.2	2.4	3.3	Total
1976		7.2		78.6	2.3	1.2	10.6				100.0
1977		3.3		68.7	0.7	0.3	26.9				100.0
1978		10.8		79.9	0.7	0.5	8.0		0.1		100.0
1979		4.8		84.9	0.2	1.2	8.7		0.1	0.1	100.0
1980		4.7		79.1	1.5	0.5	14.0		0.1	0.1	100.0
1981		6.2		53.1	1.3	0.3	38.9		0.2		100.0
1982	0.1	5.2		81.9	1.3	0.6	10.3		0.1	0.6	100.0
1983		6.5		62.8	2.5	0.3	27.9				100.0
Mean 76-83		6.1		73.6	1.3	0.6	18.2		0.1	0.1	100.0
SD 76-83		2.3		11.0	0.8	0.4	11.6		0.1	0.2	
Min 76-83	0.1	3.3		53.1	0.2	0.3	8.0		0.1	0.1	100.0
Max 76-83	0.1	10.8		84.9	2.5	1.2	38.9		0.2	0.6	100.0
CV 76-83	1.5	0.4	2.3	0.2	0.6	0.6	0.6	2.3	0.7	2.1	

a Escapements not enumerated.

b Ages 1.4 and 2.3 for 1984 return estimated.

Table 13. Brood year returns and return per spawner of Chilkat Lake sockeye salmon for parent years 1971 to 1984.

## Part A - Numbers of Fish by Age Class

Brood Year	Escapement	3-Year		4-Year		5-Year			6-Year			7-Year		8-Year	Total Return	Total Return/ Spawner	
		1.1	0.3	1.2	2.1	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.3			
1971	49,342			3,890		21,178	65,584			18,340					108,992	2.2	
1972	51,850			5,743	1,050	19,708	41,592			45,651	693		669		115,106	2.2	
1973	50,527	175		2,793		16,232	84,795			37,782	165				141,942	2.8	
1974	82,811			9,715		55,523	98,469			35,322	10,160	20	390		209,599	2.5	
1975	41,520			3,975		9,184	68,309		56	57,075	933		896		140,428	3.4	
1976	69,729			3,053		21,729	50,546			97,129	1,799	23	180		174,459	2.5	
1977	41,044			1,717	83	32,174	69,986		95	103,005	435	83	141		207,719	5.1	
1978	67,528			3,503	1,550	73,011	69,181		117	51,630	295	57	23		199,367	3.0	
1979	80,589	220		6,720	4,478	68,712	88,155		666	119,535	582	79	385		289,532	3.6	
1980	95,347	967	41	2,438	1,756	28,755	52,774	125	22	114,318	2,487	95	305		204,083	2.1	
1981	84,089	134		1,124	2,229	13,851	56,490		27	41,795	645	40	240	70	116,575	1.4	
1982	80,221	444		4,206	470	35,487	36,351		125	54,702	258		184		132,227	1.6	
1983	134,207			1,691	1,555	30,616	15,776		130	89,442	63				139,273	1.0	
1984	115,269	711		2,271	21	113,020	95,071			113,000 <sup>a</sup>					324,094	2.8	
1985	57,724			1,771	38												
1986	23,947	132															
1987	48,593																
1988	27,593																
1989	140,075																
Mean	71-84	74,577	189	3	3,774	942	38,513	63,791	9	95	66,594	1,424	33	284	6	178,814	2.59
SD	71-84	27,584	315		2,309	1,336	29,155	23,547		184	33,549	2,795	36	261		65,400	1.01
Min	71-84	41,044	132	41	1,124	21	9,184	15,776	125	22	18,340	63	20	23	70	108,992	1.04
Max	71-84	134,207	967	41	9,715	4,478	113,020	98,469	125	666	119,535	10,160	95	896	70	324,094	5.06
CV	71-84	0.37	1.66		0.61	1.42	0.76	0.37		1.93	0.50	1.96	1.07	0.92		0.37	0.39

## Part B - Brood Year Return Percent by Age Class

Year	Esc.	1.1	0.3	1.2	2.1	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.3	Total
1971	49,342			3.6		19.4	60.2			16.8					100.0
1972	51,850			5.0	0.9	17.1	36.1			39.7	0.6		0.6		100.0
1973	50,527	0.1		2.0		11.4	59.7			26.6	0.1				100.0
1974	82,811			4.6		26.5	47.0			16.9	4.8		0.2		100.0
1975	41,520			2.8		6.5	48.6			40.6	0.7		0.6		100.0
1976	69,729			1.7		12.5	29.0			55.7	1.0		0.1		100.0
1977	41,044			0.8		15.5	33.7			49.6	0.2		0.1		100.0
1978	67,528			1.8	0.8	36.6	34.7		0.1	25.9	0.1				100.0
1979	80,589	0.1		2.3	1.5	23.7	30.4		0.2	41.3	0.2		0.1		100.0
1980	95,347	0.5		1.2	0.9	14.1	25.9	0.1		56.0	1.2		0.1		100.0
1981	84,089	0.1		1.0	1.9	11.9	48.5			35.9	0.6		0.2	0.1	100.0
1982	80,221	0.3		3.2	0.4	26.8	27.5		0.1	41.4	0.2		0.1		100.0
1983	134,207			1.2	1.1	22.0	11.3		0.1	64.2					100.0
Mean 1971-83		0.1		2.4	0.6	18.8	37.9			39.3	0.8		0.2		100.0
SD 1971-83		0.2		1.4	0.7	8.2	14.2		0.1	14.8	1.3		0.2		
Min 1971-83		0.1		0.8	0.4	6.5	11.3	0.1	0.1	16.8	0.1		0.1	0.1	100.0
Max 1971-83		0.5		5.0	1.9	36.6	60.2	0.1	0.2	64.2	4.8		0.6	0.1	100.0
CV 1971-83		1.7	3.6	0.6	1.1	0.4	0.4	3.6	1.4	0.4	1.7	1.1	1.2	3.6	

<sup>a</sup> Age 2.3 for 1984 estimated by 35% of total return.

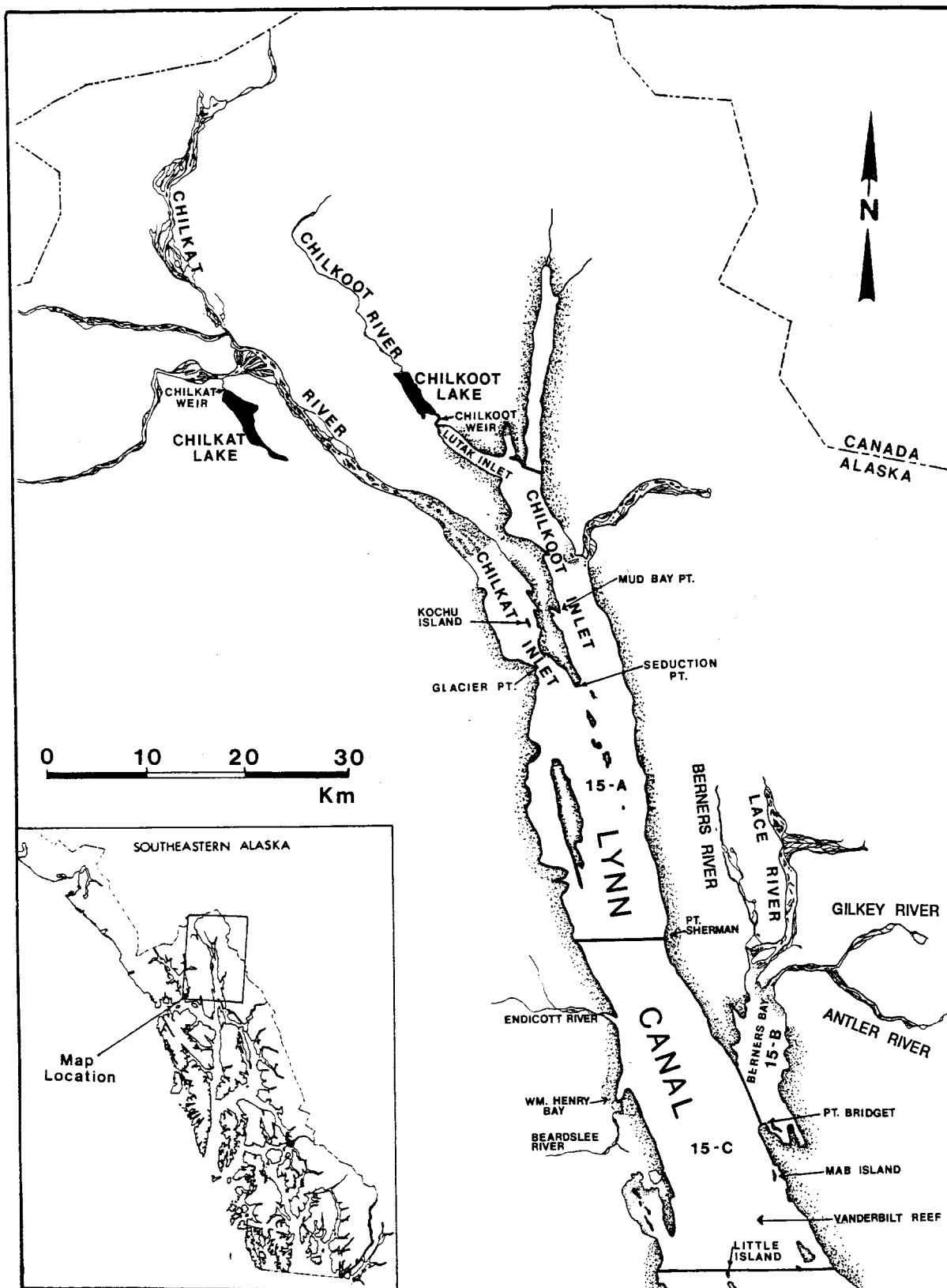


Figure 1. Lynn Canal (District 115) showing the management sections and principal spawning and rearing areas.

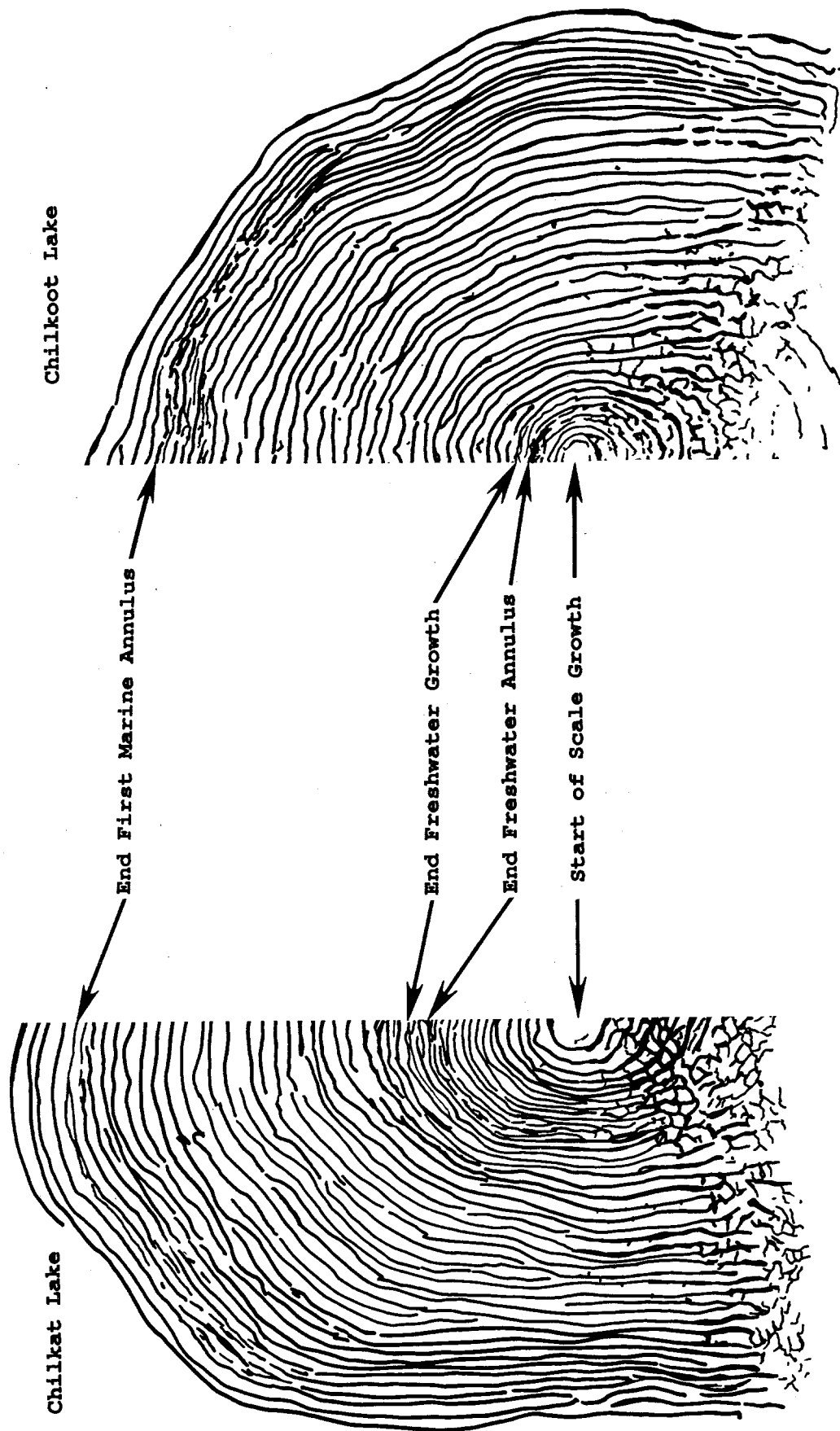


Figure 2. Typical scale patterns for age-1.3 sockeye salmon from Chilkoot and Chilkat Lakes to end of first marine year showing growth zones measured, 1989.

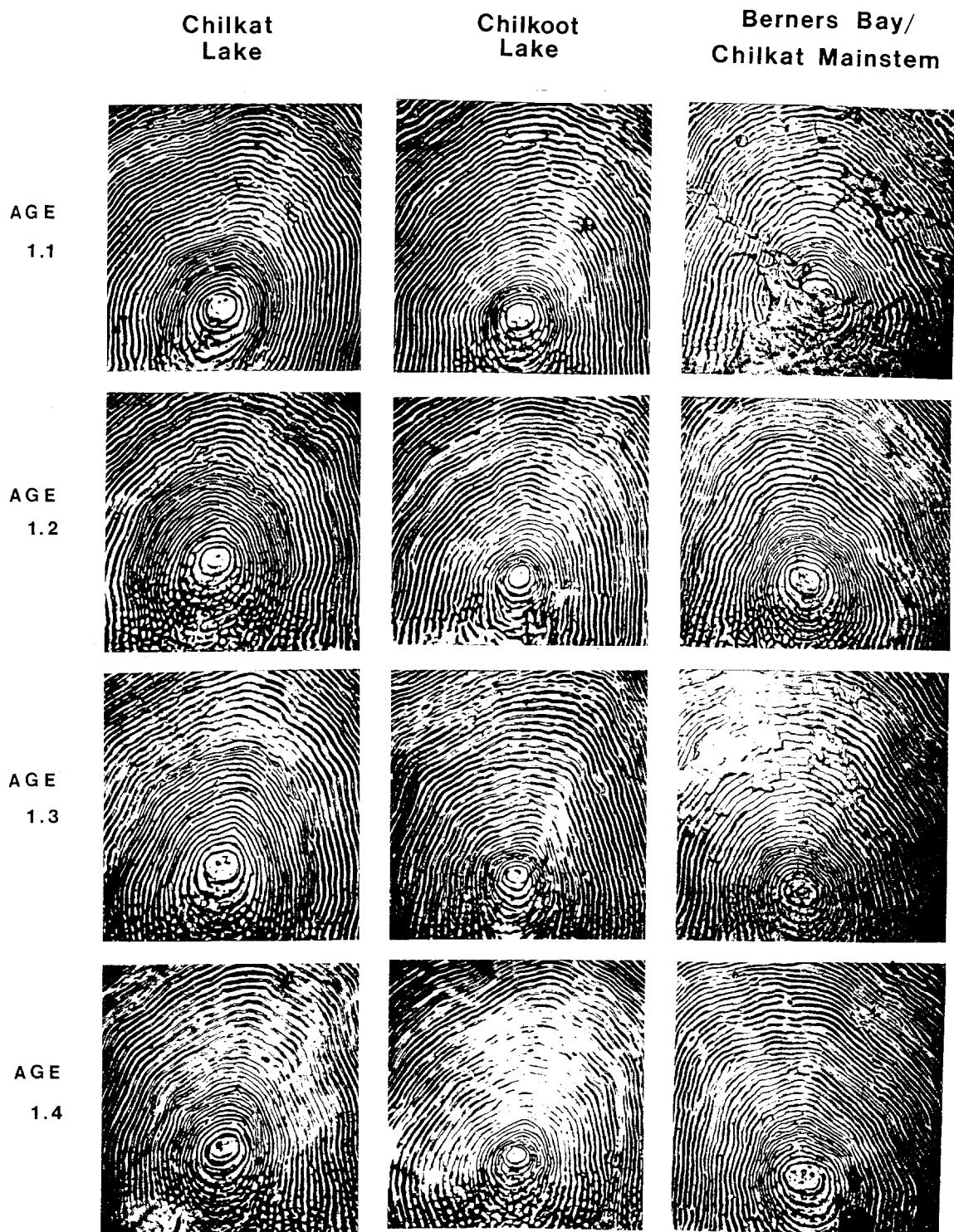


Figure 3. Typical scale patterns of sockeye salmon with one freshwater annulus from Chilkoot Lake, Chilkat Lake, and Berners Bay/Chilkat Mainstem stocks.

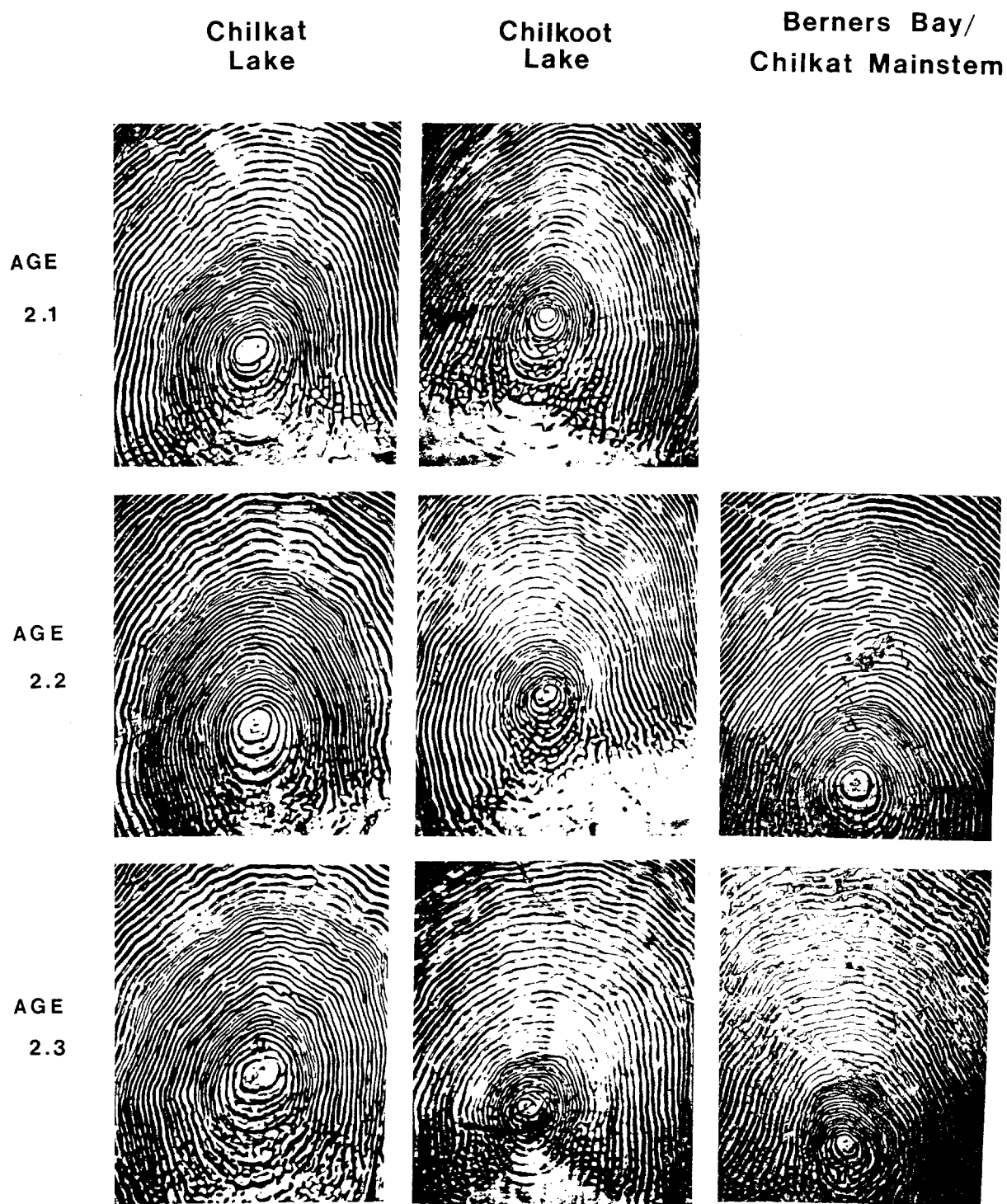


Figure 4. Typical scale patterns of sockeye salmon with two freshwater annuli from Chilkoot Lake, Chilkat Lake, and Berners Bay/Chilkat Mainstem stocks.

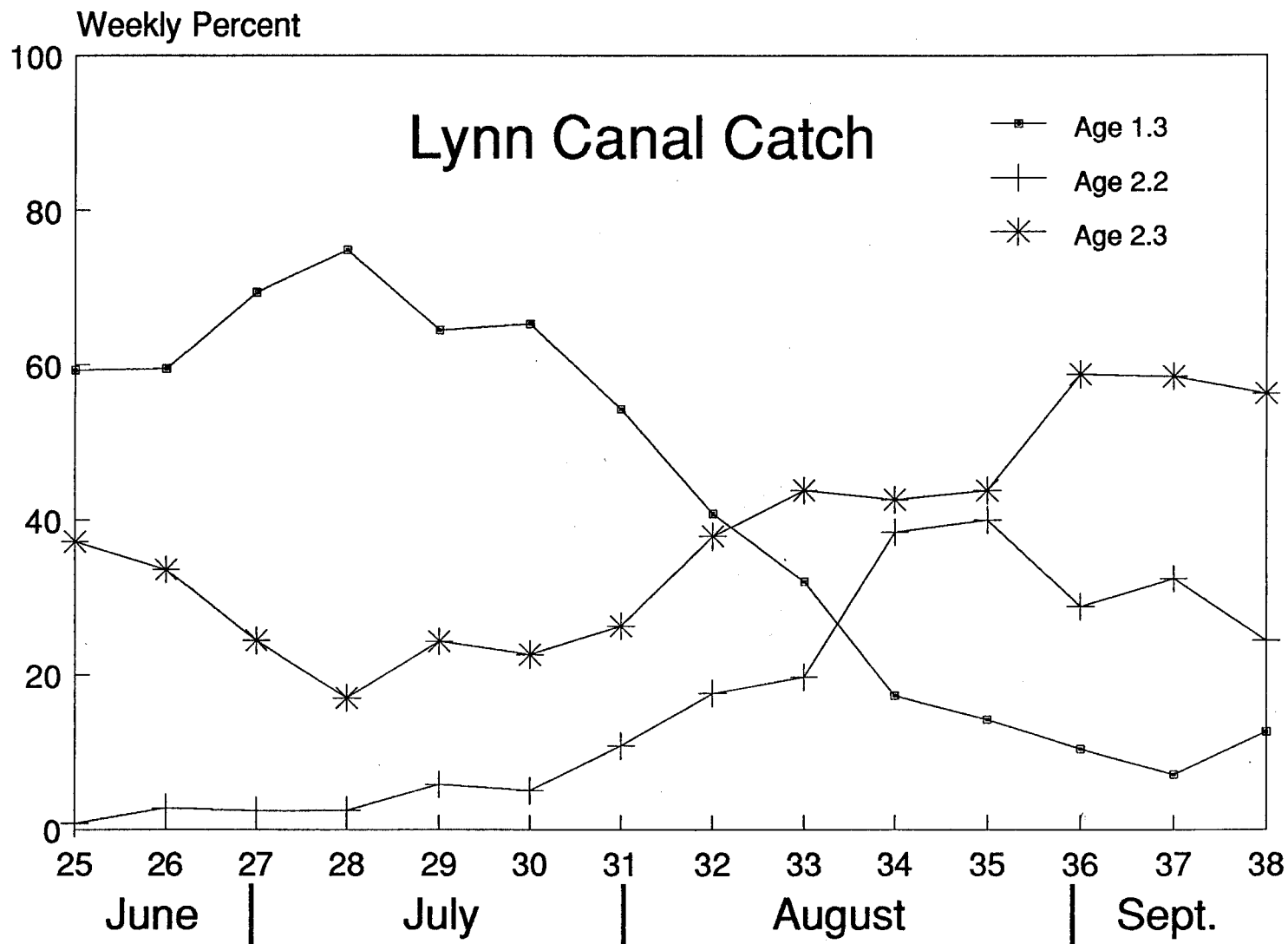


Figure 5. Weekly age composition of sockeye salmon harvested in Lynn Canal, 1989.



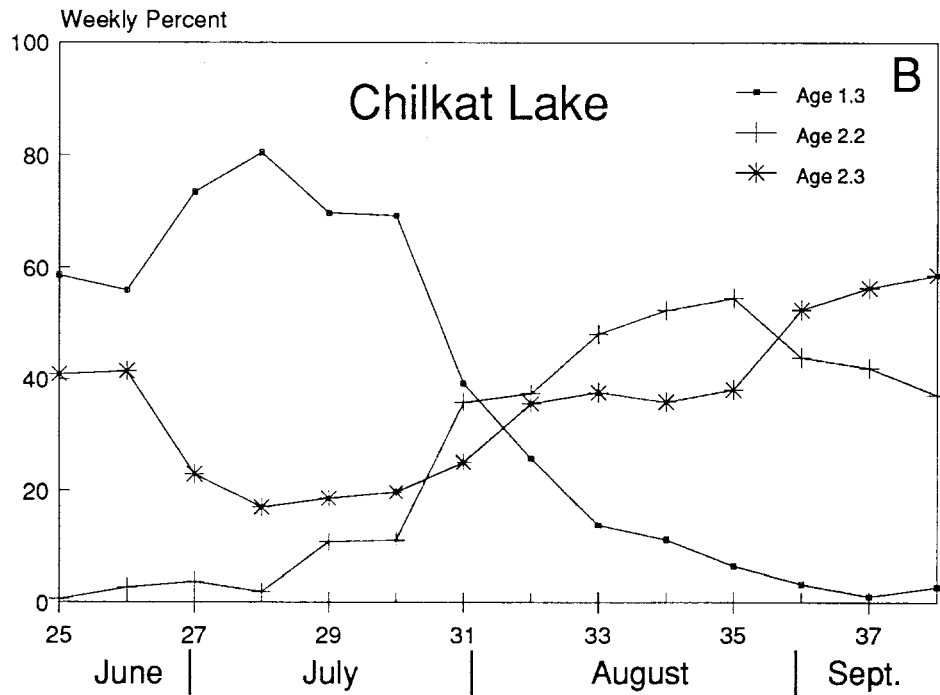
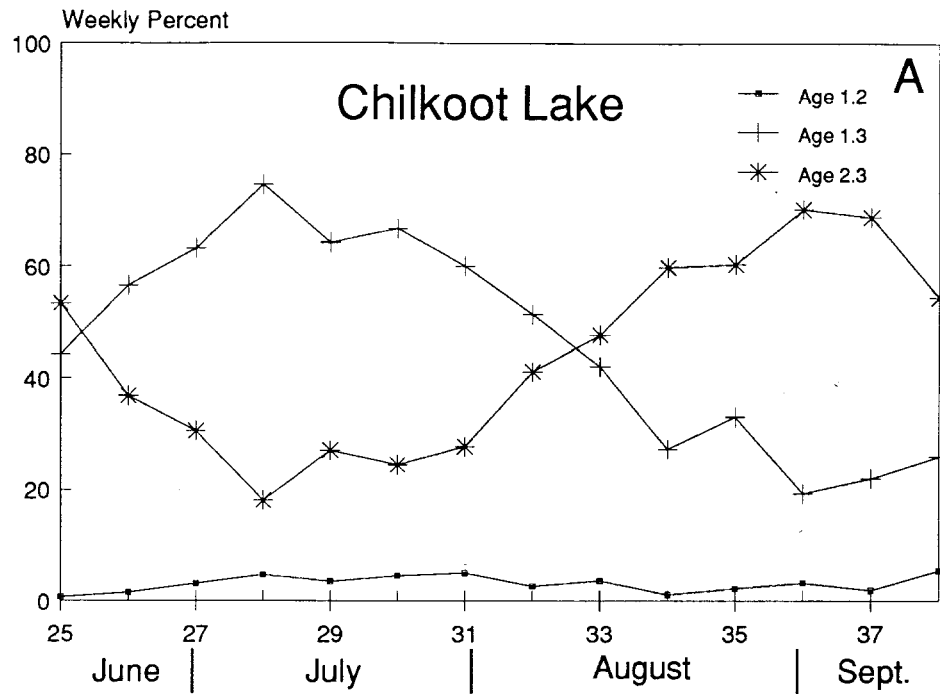


Figure 6. Weekly age composition of Chilkoot (A) and Chilkat (B) Lake sockeye salmon harvested in Lynn Canal, 1989.

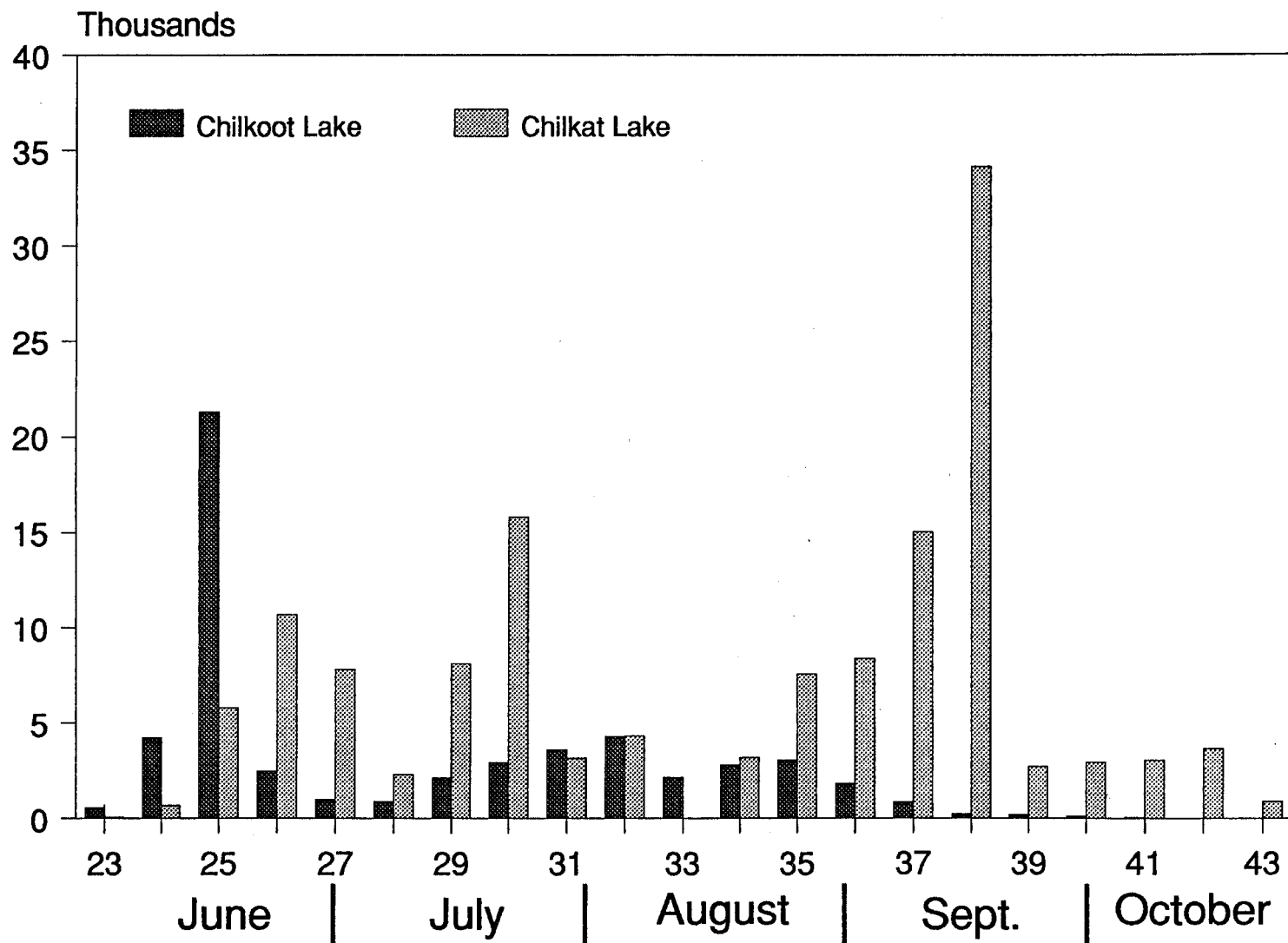


Figure 7. Weekly escapements of sockeye salmon into Chilkat and Chilkoot Lakes, 1989.

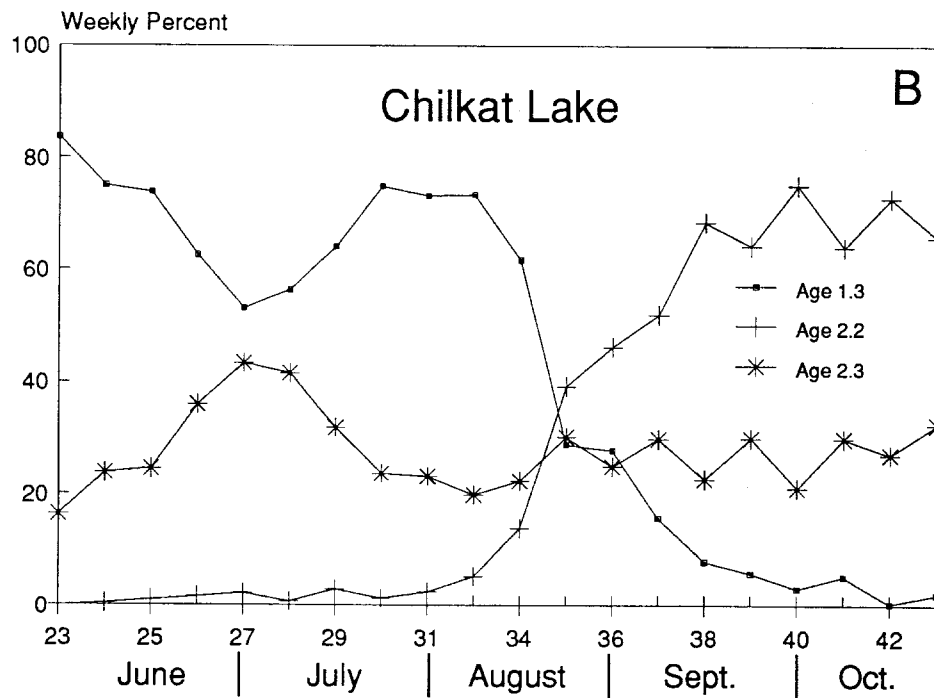
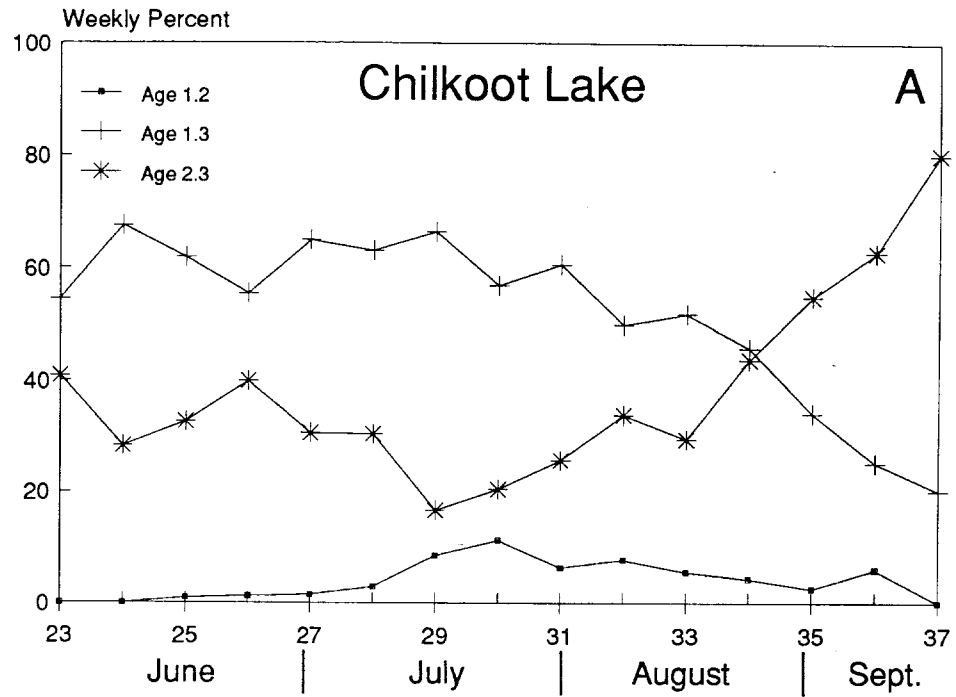


Figure 8. Period age composition of sockeye salmon escapements to Chilkoot (A) and Chilkat (B) Lakes, 1989.

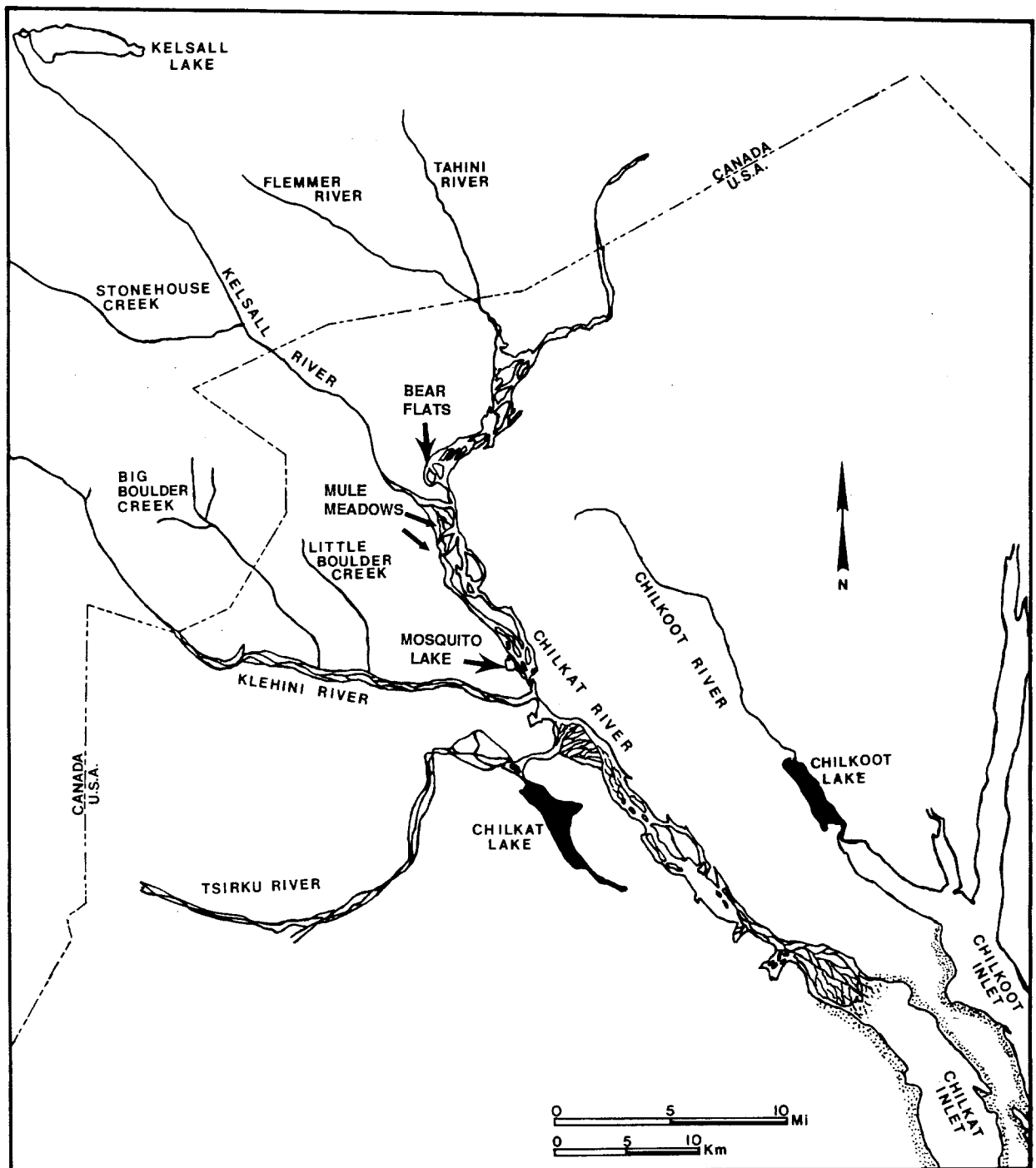
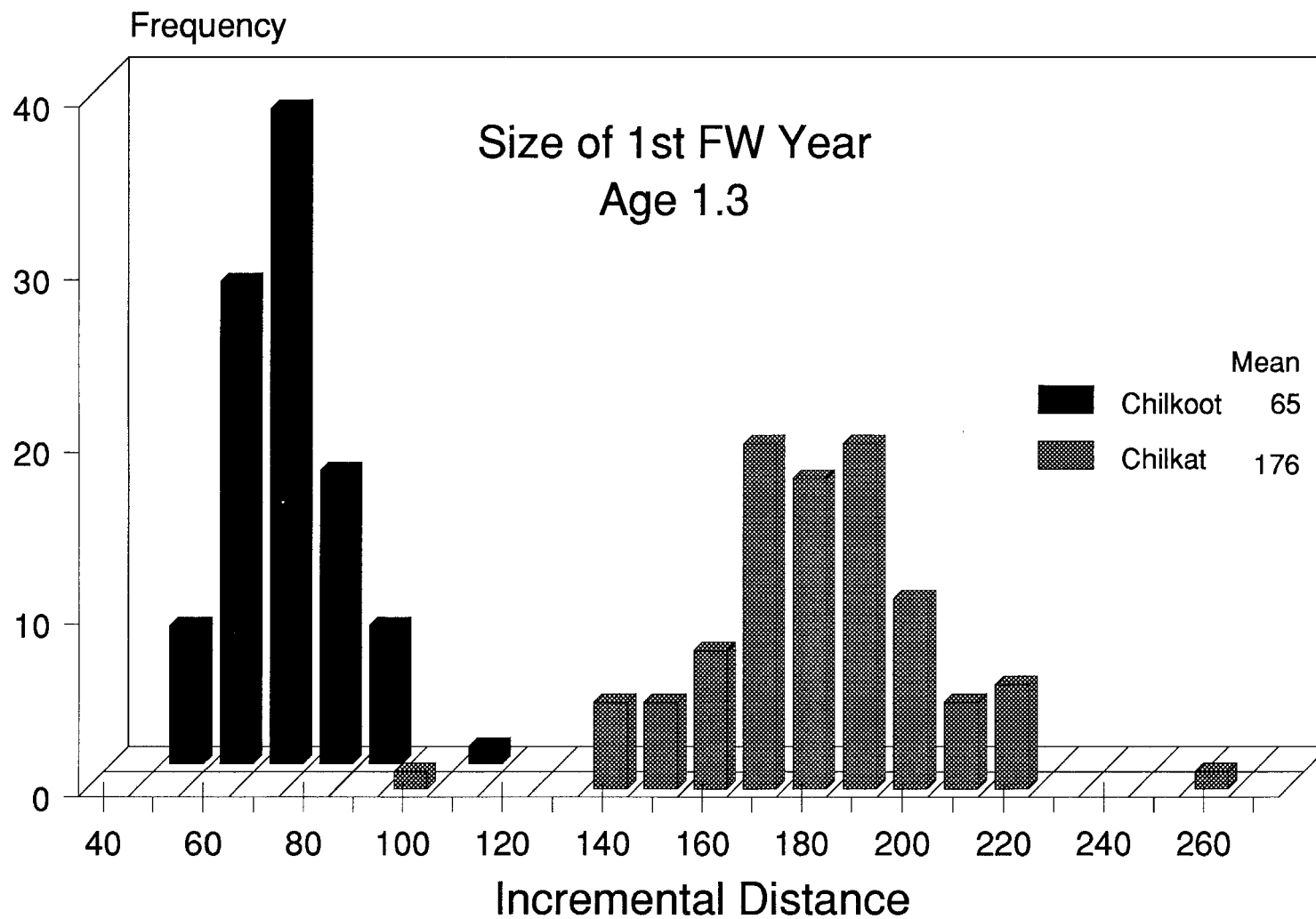


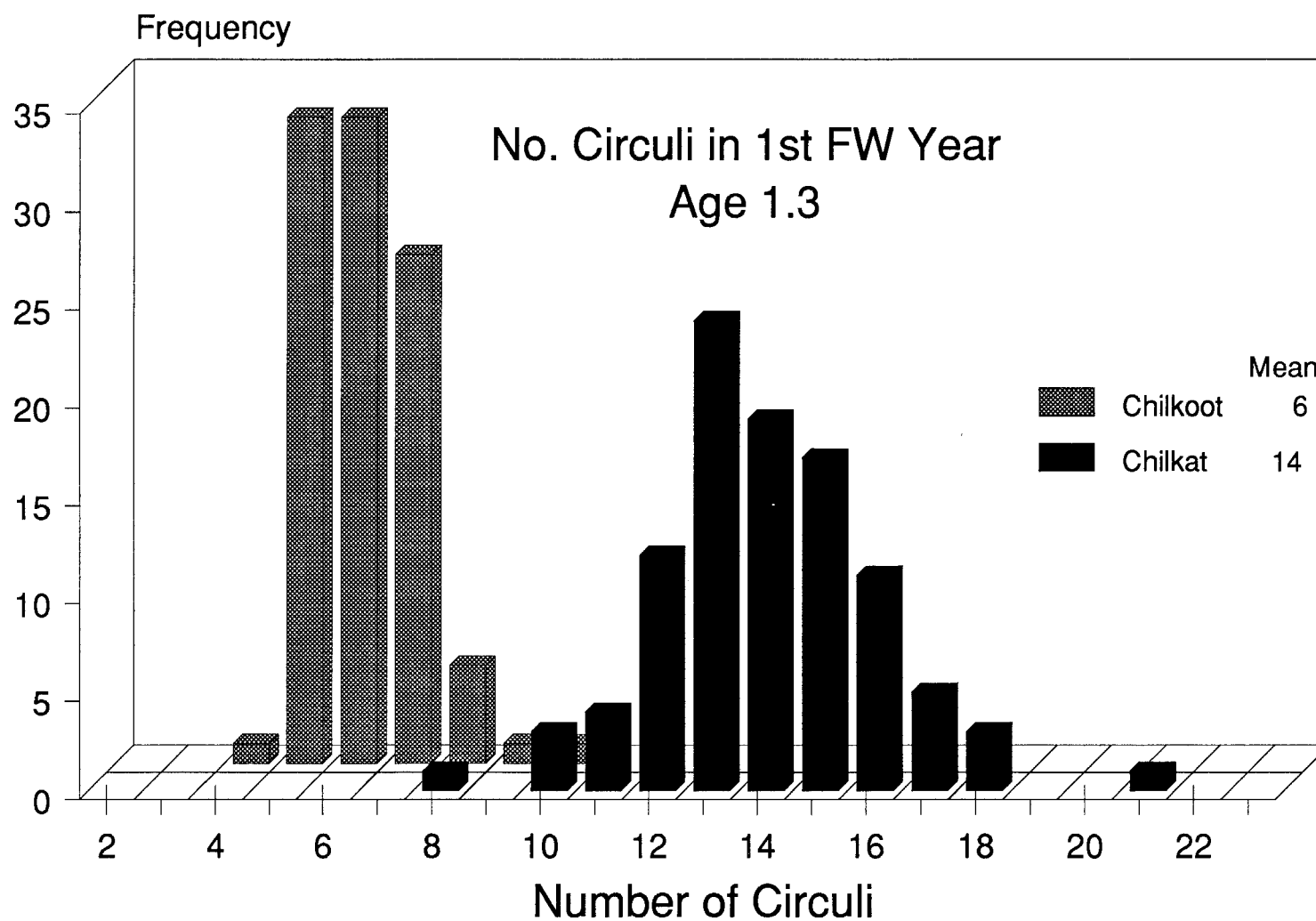
Figure 9. The Chilkoot and Chilkat River drainages.

## APPENDIX



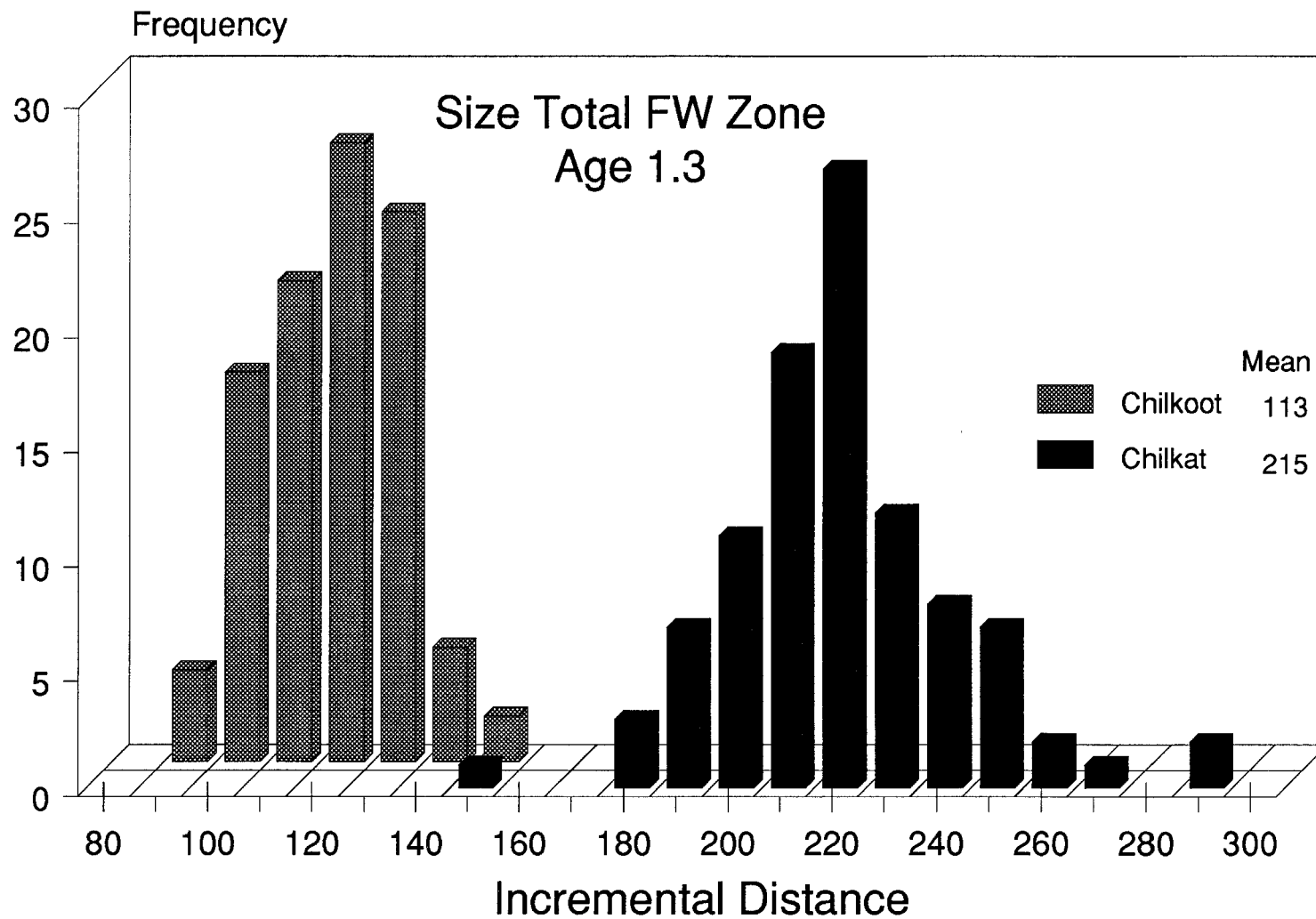


Appendix A.1 Incremental distances measured on digitizing equipment in the first freshwater annulus for fish aged 1.3 in Chilkoot and Chilkat escapements, 1989.

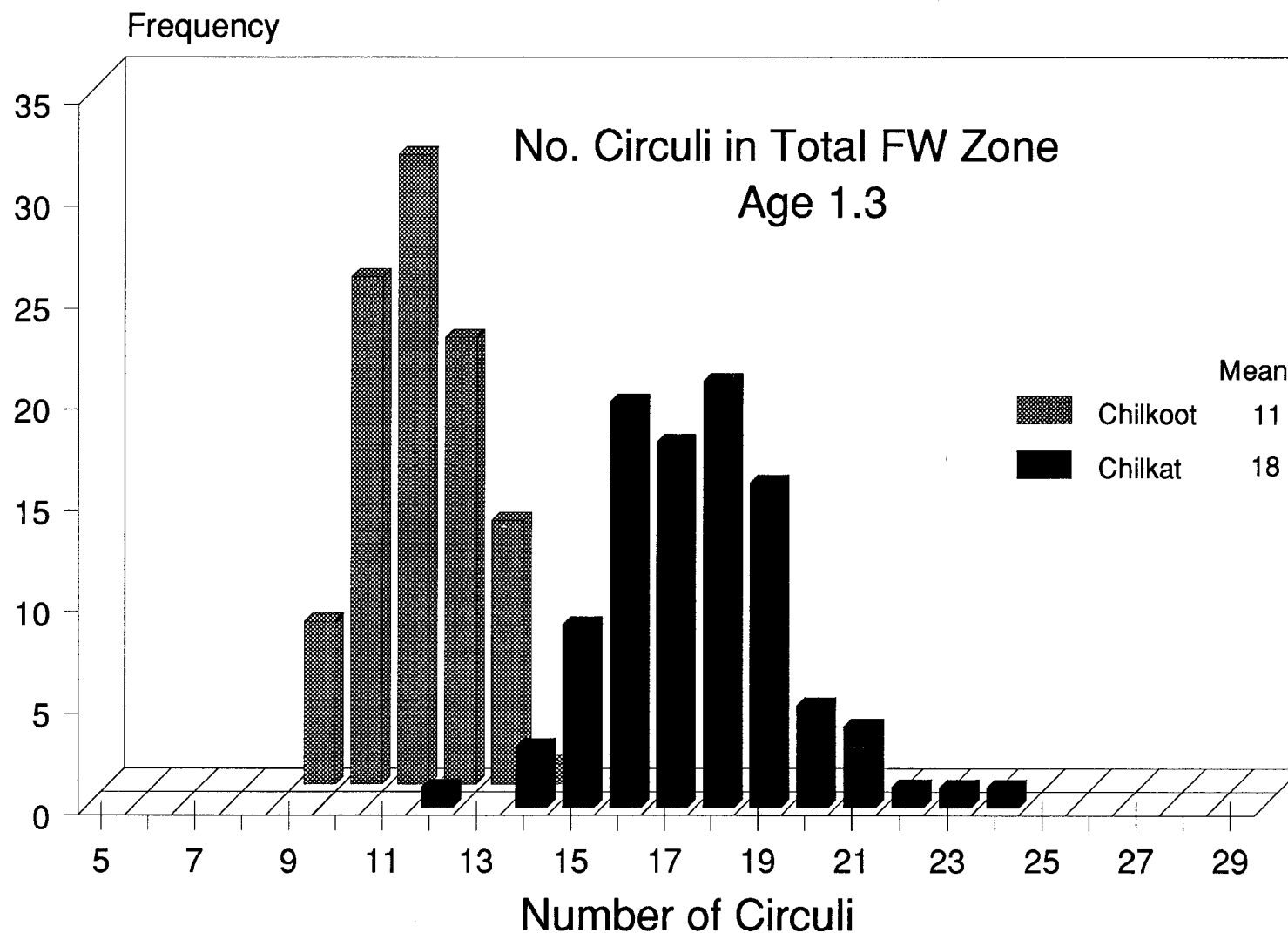


Appendix A.2 Number of circuli in the first freshwater annulus for fish aged 1.3 in Chilkooot and Chilkat escapements, 1989.





Appendix A.3 Incremental distances measured on digitizing equipment in the total freshwater zone for fish aged 1.3 in Chilkoot and Chilkat escapements, 1989.



Appendix A.4 Number of circuli in the total freshwater zone for fish aged 1.3 in Chilkooot and Chilkat escapements, 1989.

Appendix B.1. Age composition of sockeye salmon in the Lynn Canal (District 115) gillnet catch by age class and fishing period, 1989.

Brood Year and Age Class															
		1986		1985			1984			1983			1982		
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3	Total
Statistical Week	25	(June 18 - 24)													
All Fish															
Sample Size				6	3		1	223	3		140				376
Percent				1.6	0.8		0.3	59.3	0.8		37.2				100.0
Std. Error				0.6	0.5		0.3	2.5	0.5		2.5				
Number				262	132		44	9,776	132		6,137				16,483
Statistical Week	26	(June 25 - July 1)													
All Fish															
Sample Size	1			9	7			303	14	2	171			2	509
Percent	0.2			1.8	1.4			59.5	2.8	0.4	33.6			0.4	100.0
Std. Error	0.2			0.6	0.5			2.2	0.7	0.3	2.1			0.3	
Number	48			433	337			14,591	675	96	8,235			96	24,511
Statistical Week	27	(July 2 - 8)													
All Fish															
Sample Size				3	10			315	11	3	111			1	454
Percent				0.7	2.2			69.4	2.4	0.7	24.4			0.2	100.0
Std. Error				0.4	0.7			2.1	0.7	0.4	2.0			0.2	
Number				168	558			17,585	614	167	6,197			56	25,345
Statistical Week	28	(July 9 - 15)													
All Fish															
Sample Size				10	19			397	13		90			1	530
Percent				1.9	3.6			74.9	2.5		17.0			0.2	100.0
Std. Error				0.6	0.8			1.9	0.7		1.6			0.2	
Number				758	1,441			30,109	986		6,826			76	40,196
Statistical Week	29	(July 16 - 22)													
All Fish															
Sample Size				11	15			345	31	1	130			2	535
Percent				2.1	2.8			64.5	5.8	0.2	24.3			0.4	100.0
Std. Error				0.6	0.7			2.1	1.0	0.2	1.8			0.3	
Number				1,204	1,642			37,760	3,393	109	14,228			219	58,555
Statistical Week	30	(July 23 - 29)													
All Fish															
Sample Size	1	1		22	26			486	37	2	168			1	744
Percent	0.1	0.1		3.0	3.5			65.3	5.0	0.3	22.6			0.1	100.0
Std. Error	0.1	0.1		0.6	0.7			1.7	0.8	0.2	1.5			0.1	
Number	62	62		1,359	1,606			30,028	2,286	124	10,380			62	45,969
Statistical Week	31	(July 30 - August 5)													
All Fish															
Sample Size				20	21			287	57		139		1	4	529
Percent				3.8	4.0			54.3	10.8		26.3		0.2	0.8	100.0
Std. Error				0.8	0.8			2.2	1.3		1.9		0.2	0.4	
Number				2,922	3,067			41,918	8,325		20,302		146	584	77,264
Statistical Week	32	(August 6 - 12)													
All Fish															
Sample Size				7	14			243	105	1	226				596
Percent				1.2	2.3			40.8	17.6	0.2	37.9				100.0
Std. Error				0.4	0.6			2.0	1.6	0.2	2.0				
Number				902	1,805			31,323	13,535	129	29,132				76,826
Statistical Week	33	(August 13 - 19)													
All Fish															
Sample Size		1		3	13			179	110		245			8	559
Percent		0.2		0.5	2.3			32.0	19.7		43.8			1.4	100.0
Std. Error		0.2		0.3	0.6			2.0	1.7		2.1			0.5	
Number		94		282	1,221			16,810	10,330		23,009			751	52,497

-Continued-

Brood Year and Age Class														
		1986		1985			1984			1983			1982	
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3
Total														
Statistical Week	34	(August 20 - 26)												
All Fish														
Sample Size				2	5		98	218		242			3	568
Percent				0.4	0.9		17.3	38.4		42.6			0.5	100.0
Std. Error				0.2	0.4		1.6	2.0		2.1			0.3	
Number				94	235		4,612	10,260		11,390			142	26,733
Statistical Week	35	(August 27 - Sept. 2)												
All Fish														
Sample Size		1	4	3	1		71	200		219			1	500
Percent		0.2	0.8	0.6	0.2		14.2	40.0		43.8			0.2	100.0
Std. Error		0.2	0.4	0.3	0.2		1.5	2.2		2.2			0.2	
Number		38	152	114	38		2,690	7,576		8,297			38	18,943
Statistical Week	36	(Sept. 3 - 9)												
All Fish														
Sample Size			1	8			49	136	1	278				473
Percent			0.2	1.7			10.4	28.8	0.2	58.8				100.0
Std. Error			0.2	0.6			1.4	2.0	0.2	2.2				
Number			14	109			666	1,848	14	3,777				6,428
Statistical Week	37	(Sept. 10 - 16)												
All Fish														
Sample Size				1			17	78	1	141			3	241
Percent				0.4			7.1	32.4	0.4	58.5			1.2	100.0
Std. Error				0.4			1.5	2.8	0.4	2.9			0.7	
Number				7			114	524	7	947			20	1,619
Statistical Week	38	(Sept. 17 - 23)												
All Fish														
Sample Size				4			15	29	1	67	1		2	119
Percent				3.4			12.6	24.4	0.8	56.3	0.8		1.7	100.0
Std. Error				1.5			2.7	3.5	0.7	4.1	0.7		1.1	
Number				18			71	138	5	318	5		10	565
Combined Periods (Percentages are weighted by period catches)														
Male														
Sample Size	1	1	47	91			1	1,448	527	6	1,056	1	1	12
Percent	<0.1	<0.1	0.9	1.5			<0.1	24.1	6.6	0.1	13.5	<0.1	<0.1	0.2
Std. Error	<0.1	<0.1	0.1	0.2			<0.1	0.6	0.3	<0.1	0.5	<0.1	<0.1	0.1
Number	48	38	4,223	7,130			44	111,654	30,668	291	62,596	5	146	785
Female														
Sample Size		1	46	51	1		1,485	508	6	1,284		1	15	3,398
Percent		<0.1	0.9	1.0	<0.1		26.0	6.4	0.1	18.3		<0.1	0.3	53.0
Std. Error		<0.1	0.1	0.2	<0.1		0.6	0.3	<0.1	0.5		<0.1	0.1	0.7
Number		94	4,018	4,681	38		120,481	29,546	360	84,834		56	1,212	245,320
All Fish														
Sample Size	2	3	98	149	1	1	3,028	1,042	12	2,367	1	2	27	6,733
Percent	<0.1	<0.1	1.8	2.6	<0.1	<0.1	50.4	12.8	0.1	31.6	<0.1	<0.1	0.4	100.0
Std. Error	<0.1	<0.1	0.2	0.2	<0.1	<0.1	0.7	0.4	<0.1	0.6	<0.1	<0.1	0.1	
Number	110	194	8,550	12,292	38	44	238,053	60,622	651	149,175	5	202	1,998	471,934

Appendix B.2. Test for significant changes among periods in the age composition of Lynn Canal (District 115) sockeye salmon gill net catch by age class, 1989.

Brood Year and Age Class													
Periods Compared	1986		1985			1984			1983			1982	
	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3
1, 2								S					
1, 3							S**			S**			
1, 4				S**			S**			S**			
1, 5				S				S**		S**			
1, 6				S**			S	S**		S**			
1, 7			S	S**				S**		S**			
1, 8							S**	S**					
1, 9							S**	S**		S			S*
1, 10			S				S**	S**					
1, 11							S**	S**		S			
1, 12			S				S**	S**		S**			
1, 13							S**	S**		S**			
1, 14							S**	S**		S**			
2, 3							S**			S**			S
2, 4				S*			S**			S**			
2, 5								S*		S**			
2, 6				S*			S*	S		S**			
2, 7			S	S**			S	S**		S**			
2, 8							S**	S**					
2, 9							S**	S**		S**			
2, 10			S*				S**	S**		S**			
2, 11							S**	S**		S**			
2, 12			S*				S**	S**		S**			
2, 13			S				S**	S**		S**			
2, 14							S**	S**		S**			
3, 4							S			S**			
3, 5								S**					
3, 6			S**					S*					
3, 7			S**					S**					
3, 8							S**	S**					
3, 9							S**	S**		S**			S*
3, 10							S**	S**		S**			
3, 11				S			S**	S**		S**			
3, 12							S**	S**		S**			
3, 13							S**	S**		S**			S
3, 14							S**	S**		S**			S
4, 5							S**	S**		S**			
4, 6							S**	S*		S**			
4, 7			S				S**	S**		S**			
4, 8							S**	S**		S**			
4, 9			S				S**	S**		S**			S
4, 10			S*	S**			S**	S**		S**			
4, 11				S**			S**	S**		S**			
4, 12			S*	S			S**	S**		S**			
4, 13			S	S*			S**	S**		S**			
4, 14							S**	S**		S**			
5, 6													
5, 7							S**	S**					
5, 8							S**	S**		S**			
5, 9			S*				S**	S**		S**			
5, 10			S**	S*			S**	S**		S**			
5, 11				S**			S**	S**		S**			
5, 12			S**				S**	S**		S**			
5, 13			S	S			S**	S**		S**			
5, 14							S**	S**		S**			
6, 7							S**	S**					
6, 8			S*				S**	S**		S**			
6, 9			S**				S**	S**		S**			S**
6, 10			S**	S**			S**	S**		S**			
6, 11			S**	S**			S**	S**		S**			
6, 12			S**	S			S**	S**		S**			
6, 13			S**	S*			S**	S**		S**			S
6, 14							S**	S**		S**			S
7, 8			S**				S**	S**		S**			
7, 9			S**				S**	S**		S**			
7, 10			S**	S**			S**	S**		S**			
7, 11			S**	S**			S**	S**		S**			
7, 12			S**	S			S**	S**		S**			
7, 13			S**	S**			S**	S**		S**			
7, 14			S				S**	S**		S**			
8, 9							S**			S*			S**
8, 10				S			S**	S**					
8, 11				S*			S**	S**		S			
8, 12							S**	S**		S**			
8, 13							S**	S**		S**			S*
8, 14							S**			S**			S*
9, 10				S			S**	S**					
9, 11				S*			S**	S**					S
9, 12							S**	S**		S**			S*
9, 13							S**	S**		S**			
9, 14							S**			S**			
10, 11													
10, 12							S**	S**		S**			
10, 13							S**			S**			
10, 14				S				S**		S**			
11, 12							S	S**		S**			
11, 13							S**	S		S**			
11, 14				S*				S**		S**			
12, 13													S
12, 14													S
13, 14				S									

S = significant at probability = 0.10  
S\* = significant at probability = 0.05  
S\*\* = significant at probability = 0.01

Appendix B.3. Estimated contribution of sockeye salmon stocks to the Lynn Canal (District 115) drift gillnet fishery by age class and statistical week, 1989.

Stat. Week	Stock	Brood Year and Age Class												Total	Prop.	
		1986		1985			1984			1983			1982			
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4			3.3
25	Chilkoot L.				39			2,512	90		3,032				5,673	0.344
	Chilkat L.							4,449	42		3,105				7,596	0.461
	Berners/Mainstem			262	93		44	2,815							3,214	0.195
	Total			262	132		44	9,776	132		6,137				16,483	1.000
26	Chilkoot L.				185			7,150	443	96	4,670			96	12,640	0.516
	Chilkat L.							4,742	232		3,516				8,490	0.346
	Berners/Mainstem	48		433	152			2,699			49				3,381	0.138
	Total	48		433	337			14,591	675	96	8,235			96	24,511	1.000
27	Chilkoot L.				382			7,878	228	111	3,811			56	12,466	0.492
	Chilkat L.							7,667	386		2,386				10,439	0.412
	Berners/Mainstem			168	176			2,040		56					2,440	0.096
	Total			168	558			17,585	614	167	6,197			56	25,345	1.000
28	Chilkoot L.				1,286			20,384	619		4,928			76	27,293	0.679
	Chilkat L.				76			8,972	215		1,898				11,161	0.278
	Berners/Mainstem			758	79			753	152						1,742	0.043
	Total			758	1,441			30,109	986		6,826			76	40,196	1.000
29	Chilkoot L.				1,532			28,094	1,900	109	11,838			219	43,692	0.746
	Chilkat L.				110			8,949	1,384		2,390				12,833	0.219
	Berners/Mainstem			1,204				717	109						2,030	0.035
	Total			1,204	1,642			37,760	3,393	109	14,228			219	58,555	1.000
30	Chilkoot L.		62		1,542			23,002	1,198	124	8,449			62	34,439	0.749
	Chilkat L.							6,786	1,088		1,931				9,805	0.213
	Berners/Mainstem	62		1,359	64			240							1,725	0.038
	Total	62	62	1,359	1,606			30,028	2,286	124	10,380			62	45,969	1.000
31	Chilkoot L.				3,067			36,888	3,730		17,094			146	58,509	0.796
	Chilkat L.							5,030	4,595		3,208				12,833	0.166
	Berners/Mainstem			2,922											2,922	0.038
	Total			2,922	3,067			41,918	8,325		20,302			146	77,264	1.000
32	Chilkoot L.				1,148			22,584	1,976	129	18,120				43,957	0.572
	Chilkat L.				386			7,956	11,559		11,012				30,913	0.402
	Berners/Mainstem			902	271			783							1,956	0.025
	Total			902	1,805			31,323	13,535	129	29,132				76,826	1.000
33	Chilkoot L.				1,221			14,171	1,436		16,060			751	33,639	0.641
	Chilkat L.		94					2,555	8,894		6,949				18,492	0.352
	Berners/Mainstem			282				84							366	0.007
	Total		94	282	1,221			16,810	10,330		23,009			751	52,497	1.000
34	Chilkoot L.				92			2,241	821		4,909			142	8,205	0.307
	Chilkat L.				94			2,020	9,439		6,481				18,034	0.675
	Berners/Mainstem			94	49			351							494	0.018
	Total			94	235			4,612	10,260		11,390			142	26,733	1.000
35	Chilkoot L.				114			1,735	235		3,161				5,245	0.277
	Chilkat L.		38			38		874	7,341		5,136			38	13,465	0.711
	Berners/Mainstem			152				81							233	0.012
	Total		38	152	114	38		2,690	7,576		8,297			38	18,943	1.000
36	Chilkoot L.				81			483	166	14	1,753				2,497	0.388
	Chilkat L.				14			128	1,682		2,009				3,833	0.596
	Berners/Mainstem			14	14			55			15				98	0.015
	Total			14	109			666	1,848	14	3,777				6,428	1.000
37	Chilkoot L.				7			81	7	7	254			13	369	0.228
	Chilkat L.							14	517		693			7	1,231	0.760
	Berners/Mainstem							19							19	0.012
	Total				7			114	524	7	947			20	1,619	1.000
38	Chilkoot L.				13			62	19	5	130			10	239	0.423
	Chilkat L.							9	119		188	5			321	0.568
	Berners/Mainstem				5										5	0.009
	Total				18			71	138	5	318	5		10	565	1.000
Combined Periods																
25-38	Chilkoot L.		62		10,709			167,265	12,868	595	98,209		202	1,953	291,863	0.618
	Chilkat L.		132		680	38		60,151	47,493		50,902	5		45	159,446	0.338
	Berners/Mainstem	110		8,550	903		44	10,637	261	56	64				20,625	0.044
	Total	110	194	8,550	12,292	38	44	238,053	60,622	651	149,175	5	202	1,998	471,934	1.000

Appendix B.4. Numbers of scales classified to Chilkoot Lake, Chilkat Lake, and Berners Bay/Chilkat Mainstem by age class and fishing period, 1989.

Stat Week	Stock	Brood Year and Age Class													Total
		1986		1985			1984			1983		1982			
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3	
25	Chilkoot L.				1			59	2		72				134
	Chilkat L.							97	1		68				166
	Berners/Mainstem			6	2		1	67							76
	Total			6	3		1	223	3		140				376
26	Chilkoot L.				4			148	9	2	100			2	265
	Chilkat L.							94	5		70				169
	Berners/Mainstem	1		9	3			61			1				75
	Total	1		9	7			303	14	2	171			2	509
27	Chilkoot L.				7			140	4	2	70		1		224
	Chilkat L.							131	7		41				179
	Berners/Mainstem			3	3			44		1					51
	Total			3	10			315	11	3	111		1		454
28	Chilkoot L.				17			264	8		66			1	356
	Chilkat L.				1			113	3		24				141
	Berners/Mainstem			10	1			20	2						33
	Total			10	19			397	13		90			1	530
29	Chilkoot L.				14			252	17	1	109			2	395
	Chilkat L.				1			78	13		21				113
	Berners/Mainstem			11				15	1						27
	Total			11	15			345	31	1	130			2	535
30	Chilkoot L.		1		25			365	19	2	138			1	551
	Chilkat L.							105	18		30				153
	Berners/Mainstem	1		22	1			16							40
	Total	1	1	22	26			486	37	2	168			1	744
31	Chilkoot L.				21			249	25		118		1	4	418
	Chilkat L.							34	32		21				87
	Berners/Mainstem			20				4							24
	Total			20	21			287	57		139		1	4	529
32	Chilkoot L.				9			172	15	1	144				341
	Chilkat L.				3			59	90		82				234
	Berners/Mainstem			7	2			12							21
	Total			7	14			243	105	1	226				596
33	Chilkoot L.				13			148	15		174			8	358
	Chilkat L.		1					26	95		71				193
	Berners/Mainstem			3				5							8
	Total		1	3	13			179	110		245			8	559
34	Chilkoot L.				2			47	17		110			3	179
	Chilkat L.				2			41	201		132				376
	Berners/Mainstem			2	1			10							13
	Total			2	5			98	218		242			3	568
35	Chilkoot L.				3			45	6		89				143
	Chilkat L.		1			1		22	194		130			1	349
	Berners/Mainstem			4				4							8
	Total		1	4	3	1		71	200		219			1	500
36	Chilkoot L.				6			35	12	1	135				189
	Chilkat L.				1			9	124		142				276
	Berners/Mainstem			1	1			5			1				8
	Total			1	8			49	136	1	278				473
37	Chilkoot L.				1			12	1	1	42			2	59
	Chilkat L.							2	77		99			1	179
	Berners/Mainstem							3							3
	Total				1			17	78	1	141			3	241
38	Chilkoot L.				3			13	4	1	29			2	52
	Chilkat L.							2	25		38	1			66
	Berners/Mainstem				1										1
	Total				4			15	29	1	67	1		2	119
Combined Periods (Percentages are weighted by period catches)															
	Chilkoot L.		1		126			1,949	154	11	1,396		2	25	3,664
	Chilkat L.		2		8	1		813	885		969	1		2	2,681
	Berners/Mainstem	2		98	15		1	266	3	1	2				388
	Total	2	3	98	149	1	1	3,028	1,042	12	2,367	1	2	27	6,733

Appendix B.5. Age composition of Chilkooot Lake sockeye salmon harvested in Lynn Canal (District 115) by statistical week, 1989.

Brood Year and Age Class									
	1986	1985	1984		1983		1982		Total
	1.1	1.2	1.3	2.2	1.4	2.3	2.4	3.3	
Statistical Week	25		(June 18 - 24)						
Percent		0.7	44.3	1.6		53.4			100.0
SE		46	107	65		203			121
Catch		39	2,512	90		3,032			5,673
Statistical Week	26		(June 25 - July 1)						
Percent		1.5	56.6	3.5	0.8	36.9		0.8	100.0
SE		98	522	148	69	446		69	584
Catch		185	7,150	443	96	4,670		96	12,640
Statistical Week	27		(July 2 - 8)						
Percent		3.1	63.2	1.8	0.9	30.6	0.4		100.0
SE		147	582	113	85	437	53		633
Catch		382	7,878	228	111	3,811	56		12,466
Statistical Week	28		(July 9 - 15)						
Percent		4.7	74.7	2.3		18.1		0.3	100.0
SE		309	936	220		580		78	887
Catch		1,286	20,384	619		4,928		76	27,293
Statistical Week	29		(July 16 - 22)						
Percent		3.5	64.3	4.3	0.2	27.1		0.5	100.0
SE		404	1,361	456	113	1,025		160	1,218
Catch		1,532	28,094	1,900	109	11,838		219	43,692
Statistical Week	30		(July 23 - 29)						
Percent	0.2	4.5	66.8	3.5	0.4	24.5		0.2	100.0
SE	53	304	925	273	92	663		53	832
Catch	62	1,542	23,002	1,198	124	8,449		62	34,439
Statistical Week	31		(July 30 - August 5)						
Percent		5.0	60.0	6.1		27.8	0.2	0.9	100.0
SE		659	1,676	735		1,406	150	300	1,361
Catch		3,067	36,888	3,730		17,094	146	584	61,509
Statistical Week	32		(August 6 - 12)						
Percent		2.6	51.4	4.5	0.3	41.2			100.0
SE		379	1,501	505	141	1,393			1,667
Catch		1,148	22,584	1,976	129	18,120			43,957
Statistical Week	33		(August 13 - 19)						
Percent		3.6	42.1	4.3		47.7		2.2	100.0
SE		333	1,026	363		1,065		261	1,141
Catch		1,221	14,171	1,436		16,060		751	33,639

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Brood Year and Age Class								
	1986	1985	1984		1983		1982	
	1.1	1.2	1.3	2.2	1.4	2.3	2.4	3.3
Total								
Statistical Week	34	(August 20 - 26)						
Percent		1.1	27.3	10.0		59.8		1.7
SE		68	320	200		495		79
Catch		92	2,241	821		4,909		142
Statistical Week	35	(August 27 - Sept. 2)						
Percent		2.2	33.1	4.5		60.3		
SE		65	250	92		361		
Catch		114	1,735	235		3,161		
Statistical Week	36	(Sept. 3 - 9)						
Percent		3.2	19.3	6.6	0.6	70.2		
SE		33	80	48	13	149		
Catch		81	483	166	14	1,753		
Statistical Week	37	(Sept. 10 - 16)						
Percent		1.9	22.0	1.9	1.9	68.8		3.5
SE		7	23	7	7	46		10
Catch		7	81	7	7	254		13
Statistical Week	38	(Sept. 17 - 23)						
Percent		5.4	25.9	7.9	2.1	54.4		4.2
SE		8	16	10	5	24		7
Catch		13	62	19	5	130		10
Combined Periods (Percentages are weighted by period catches)								
Percent	<0.1	3.7	57.3	4.4	0.2	33.6	0.1	0.7
SE	53	1,041	3,239	1,161	231	2,777	159	451
Catch	62	10,709	167,265	12,868	595	98,209	202	1,953

Appendix B.6. Age composition of Chilkat Lake sockeye salmon  
harvested in Lynn Canal (District 115) by statistical  
week, 1989.

Brood Year and Age Class								
	1986	1985	1984	1983	1982			
	1.1	1.2	2.1	1.3	2.2	2.3	3.2	3.3
Total								
Statistical Week	25	(June 18 - 24)						
Percent			58.6	0.6	40.9			100.0
SE			190	46	208			79
Catch			4,449	42	3,105			7,596
Statistical Week	26	(June 25 - July 1)						
Percent			55.9	2.7	41.4			100.0
SE			457	109	403			556
Catch			4,742	232	3,516			8,490
Statistical Week	27	(July 2 - 8)						
Percent			73.4	3.7	22.9			100.0
SE			595	146	361			639
Catch			7,667	386	2,386			10,439
Statistical Week	28	(July 9 - 15)						
Percent	0.7		80.4	1.9	17.0			100.0
SE	76		786	134	381			843
Catch	76		8,972	215	1,898			11,161
Statistical Week	29	(July 16 - 22)						
Percent	0.9		69.7	10.8	18.6			100.0
SE	109		951	392	517			1,092
Catch	110		8,949	1,384	2,390			12,833
Statistical Week	30	(July 23 - 29)						
Percent			69.2	11.1	19.7			100.0
SE			627	261	357			727
Catch			6,786	1,088	1,931			9,805
Statistical Week	31	(July 30 - August 5)						
Percent			39.2	35.8	25.0			100.0
SE			822	809	691			1,266
Catch			5,030	4,595	3,208			12,833
Statistical Week	32	(August 6 - 12)						
Percent	1.2		25.7	37.4	35.6			100.0
SE	217		990	1,128	1,171			1,613
Catch	386		7,956	11,559	11,012			30,913
Statistical Week	33	(August 13 - 19)						
Percent	0.5		13.8	48.1	37.6			100.0
SE	99		496	834	808			1,109
Catch	94		2,555	8,894	6,949			18,492

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Brood Year and Age Class									
	1986	1985		1984		1983		1982	
	1.1	1.2	2.1	1.3	2.2	2.3	3.2	3.3	Total
Statistical Week	34 (August 20 - 26)								
Percent		0.5		11.2	52.3	35.9			100.0
SE		64		308	539	536			583
Catch		94		2,020	9,439	6,481			18,034
Statistical Week	35 (August 27 - Sept. 2)								
Percent	0.3		0.3	6.5	54.5	38.1		0.3	100.0
SE	38		38	183	413	415		38	424
Catch	38		38	874	7,341	5,136		38	13,465
Statistical Week	36 (Sept. 3 - 9)								
Percent		0.4		3.3	43.9	52.4			100.0
SE		14		69	130	153			170
Catch		14		128	1,682	2,009			3,833
Statistical Week	37 (Sept. 10 - 16)								
Percent				1.1	42.0	56.3		0.6	100.0
SE				10	49	58		7	51
Catch				14	517	693		7	1,231
Statistical Week	38 (Sept. 17 - 23)								
Percent				2.8	37.1	58.6	1.6		100.0
SE				7	21	26	5		27
Catch				9	119	188	5		321
Combined Periods (Percentages are weighted by period catches)									
Percent	0.1	0.4	<0.1	37.7	29.8	31.9	<0.1	<0.1	100.0
SE	106	263	38	2,133	1,838	1,966	5	39	3,023
Catch	132	680	38	60,151	47,493	50,902	5	45	159,446

Appendix B.7. Age composition of Berners Bay/Chilkat River Mainstem sockeye salmon harvested in Lynn Canal (District 115) by statistical week, 1989.

Brood Year and Age Class									
	1986	1985		1984			1983		Total
	0.2	0.3	1.2	0.4	1.3	2.2	1.4	2.3	
Statistical Week	25	(June 18 - 24)							
Percent		8.2	2.9	1.4	87.6				100.0
SE		107	66	47	120				162
Catch		262	93	44	2,815				3,214
Statistical Week	26	(June 25 - July 1)							
Percent	1.4	12.8	4.5		79.8			1.4	100.0
SE	49	145	90		406			3	434
Catch	48	433	152		2,699			49	3,381
Statistical Week	27	(July 2 - 8)							
Percent		6.9	7.2		83.6		2.3		100.0
SE		99	102		444		63		467
Catch		168	176		2,040		56		2,440
Statistical Week	28	(July 9 - 15)							
Percent		43.5	4.5		43.2	8.7			100.0
SE		239	80		512	109			578
Catch		758	79		753	152			1,742
Statistical Week	29	(July 16 - 22)							
Percent		59.3			35.3	5.4			100.0
SE		363			642	19			736
Catch		1,204			717	109			2,030
Statistical Week	30	(July 23 - 29)							
Percent	3.6	78.8	3.7		13.9				100.0
SE	53	288	66		450				540
Catch	62	1,359	64		240				1,725
Statistical Week	31	(July 30 - August 5)							
Percent		100.0							100.0
SE		643							643
Catch		2,922							2,922
Statistical Week	32	(August 6 - 12)							
Percent		46.1	13.9		40.0				100.0
SE		343	190		39				389
Catch		902	271		783				1,956
Statistical Week	33	(August 13 - 19)							
Percent		77.0			23.0				100.0
SE		157			319				356
Catch		282			84				366

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Brood Year and Age Class									
	1986	1985		1984			1983		Total
	0.2	0.3	1.2	0.4	1.3	2.2	1.4	2.3	
Statistical Week	34	(August 20 - 26)							
Percent		19.0	9.9		71.1				100.0
SE		71	53		32				93
Catch		94	49		351				494
Statistical Week	35	(August 27 - Sept. 2)							
Percent		65.2			34.8				100.0
SE		76			9				76
Catch		152			81				233
Statistical Week	36	(Sept. 3 - 9)							
Percent		14.3	14.3		56.1			15.3	100.0
SE		13	14		33			1	38
Catch		14	14		55			15	98
Statistical Week	37	(Sept. 10 - 16)							
Percent					100.0				100.0
SE					12				12
Catch					19				19
Statistical Week	38	(Sept. 17 - 23)							
Percent			100.0						100.0
SE			5						5
Catch			5						5
Combined Periods (Percentages are weighted by period catches)									
Percent	0.5	41.5	4.4	0.2	51.6	1.3	0.3	0.3	100.0
SE	72	938	270	47	1,166	111	63	3	1,518
Catch	110	8,550	903	44	10,637	261	56	64	20,625

Appendix B.8. Stock composition estimates of sockeye salmon from scales collected from various sites in Lynn Canal, by week, 1989.

Part A. Scales collected at Pt. Sherman from the commercial drift gillnet fishery.

Stat. Week	Dates	Ageable Scales	Chilkoot Lake	Chilkat Lake	Berners + Chilkat Mainstem	Total
25	6/19-21	177	53.1%	36.2%	10.7%	100.0%
26	6/26	93	48.4%	35.5%	16.1%	100.0%
27	No commercial catch samples from Pt. Sherman available for weeks 27-32.					
28 <sup>a</sup>	7/3	150	36.7%	24.7%	38.6%	100.0%
29	7/10	276	67.4%	25.4%	7.2%	100.0%
30	7/17	123	70.7%	17.1%	12.2%	100.0%
31	7/23-25	218	70.6%	23.9%	5.5%	100.0%
32	7/31	187	72.2%	20.3%	7.5%	100.0%
33	8/8	100	74.0%	24.0%	2.0%	100.0%
34	8/13-14	158	79.1%	18.4%	2.5%	100.0%
35	8/21	30	63.3%	33.3%	3.4%	100.0%
Total		1,512				

<sup>a</sup> Weeks 28-32 samples are from St. Mary's to Pt. Sherman shoreline.

Part B. Scales collected at Pt. Sherman in the test drift gillnet fishery.

Stat. Week	Dates	Sample Size	Chilkoot Lake	Chilkat Lake	Berners/ Mainstem	Total
25	6/23	81	46.9%	37.0%	16.1%	100.0%
26	6/29	131	43.5%	46.6%	9.9%	100.0%
27	7/6-7	110	55.5%	37.3%	7.2%	100.0%
28	7/13-14	194	67.6%	27.5%	4.9%	100.0%
29	7/20-21	187	83.4%	12.3%	4.3%	100.0%
30	7/27	140	77.9%	16.4%	5.7%	100.0%
31	8/4-5	147	77.6%	18.4%	4.0%	100.0%
32	8/11-12	289	63.3%	32.5%	4.2%	100.0%
33	8/17	35	68.6%	28.6%	2.8%	100.0%
34	8/24-25	58	46.6%	51.7%	1.7%	100.0%
35	8/31	21	66.7%	33.3%	0.0%	100.0%
Total		1,393				

Part C. Scale results from Pt. Sherman combined commercial and test fisheries.

Stat. Week	Dates	Sample Size	Chilkoot Lake	Chilkat Lake	Berners/ Mainstem	Total
25	6/19-23	258	51.2%	36.4%	12.4%	100.0%
26	6/26-29	224	45.5%	42.0%	12.5%	100.0%
27 <sup>b</sup>	7/6-7	110	55.5%	37.3%	7.2%	100.0%
28	7/13-14	194	67.6%	27.5%	4.9%	100.0%
29	7/20-21	187	83.4%	12.3%	4.3%	100.0%
30	7/27	140	77.9%	16.4%	5.7%	100.0%
31	8/4-5	147	77.6%	18.4%	4.0%	100.0%
32	8/11-12	289	63.3%	32.5%	4.2%	100.0%
33	8/13-17	193	77.2%	20.2%	2.6%	100.0%
34	8/21-25	88	52.3%	45.4%	2.3%	100.0%
35	8/31	21	66.7%	33.3%	0.0%	100.0%
Total		1,851				

<sup>b</sup> Weeks 27-32 and 35 are test fishery scales only.

Part D. Scales collected in transects west of Pt. Sherman in the test fishery.

Stat. Week	Dates	Sample Size	Chilkoot Lake	Chilkat Lake	Berners/ Mainstem	Total
27	7/6-7	9	11.1%	77.8%	11.1%	100.0%
28	7/13-14	43	46.5%	39.5%	14.0%	100.0%
29	7/20	11	54.5%	45.5%	0.0%	100.0%
30	7/27	13	69.2%	15.4%	15.4%	100.0%
31	8/4	4	25.0%	75.0%	0.0%	100.0%
32	8/11-12	79	46.8%	44.3%	8.9%	100.0%
33	8/17	6	0.0%	100.0%	0.0%	100.0%
34	8/24-25	26	30.8%	65.4%	3.8%	100.0%
35	8/31	14	42.9%	57.1%	0.0%	100.0%
Total		205				

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## Part E. Scales collected at various selected sites in Lynn Canal, 1989.

Stat. Week	Location <sup>c</sup>	Dates	Sample Size	Chilkoot Lake	Chilkat Lake	Berners/ Mainstem	Total
25	St. Mary's	6/19	126	34.9%	25.4%	39.7%	100.0%
	Lower Berners Bay	6/19	29	34.9%	25.4%	39.7%	100.0%
	Slide to Sherman	6/21	55	30.9%	60.0%	9.1%	100.0%
	Piling	6/21	95	48.4%	39.0%	12.6%	100.0%
26	Lower Berners Bay	6/26	130	17.7%	24.6%	57.7%	100.0%
	Piling	6/26	108	61.1%	30.6%	8.3%	100.0%
	Pt. Seduction (E.) TF	6/29	13	53.8%	38.5%	7.7%	100.0%
27	St. Mary's	7/3	150	36.7%	24.7%	38.6%	100.0%
	Piling	7/3	35	68.6%	28.6%	2.8%	100.0%
	West of Sherman TF	7/6-7	9	11.1%	77.8%	11.1%	100.0%
	Pt. Seduction TF (W.)	7/7	12	8.3%	91.7%	0.0%	100.0%
28	Pt. Seduction TF	7/14	15	40.0%	26.7%	33.3%	100.0%
	Chilkat Inlet TF	7/13-14	75	12.0%	74.7%	13.3%	100.0%
29	E. Seduction/Mud Bay	7/17	119	99.2%	0.8%	0.0%	100.0%
	Piling	7/17-19	213	87.8%	9.9%	2.3%	100.0%
	Rockwall (S. of Piling)	7/17	82	74.4%	25.6%	0.0%	100.0%
	Chilkat Inlet TF	7/21	23	26.1%	52.2%	21.7%	100.0%
30	Mud Bay	7/24	186	98.4%	0.6%	1.0%	100.0%
	Piling	7/24	136	69.9%	21.3%	8.8%	100.0%
	Chilkat Inlet TF	7/28	33	0.0%	72.7%	27.3%	100.0%
	Mud Bay/Koot In. TF	7/28	100	89.0%	6.0%	5.0%	100.0%
	Chilkat/Seduction TF	7/28	59	52.5%	32.2%	15.3%	100.0%
	Chilkat R. TF + Subsistence	7/28	43	0.0%	97.7%	2.3%	100.0%
31	Mud Bay	7/31	335	96.4%	3.0%	0.6%	100.0%
	Pt. Whidbey	8/2	89	61.8%	25.8%	12.4%	100.0%
	Mud Bay Pt. TF	8/4	9	100.0%	0.0%	0.0%	100.0%
	E. Seduction Pt. TF	8/4	5	60.0%	20.0%	20.0%	100.0%
	Chilkat Inlet TF	8/4	57	14.0%	75.4%	10.6%	100.0%
32	Pt. Whidbey	8/8-10	388	54.4%	37.4%	8.2%	100.0%
	High Water Is (Chilkat In.)	8/7-8	87	79.3%	18.4%	2.3%	100.0%
	Set Net Site (Chilkat In.)	8/7-8	41	19.5%	75.6%	4.9%	100.0%
	Off Pt. Seduction	8/7-8	33	27.3%	69.7%	3.0%	100.0%
33	East Pt. Seduction	8/13-14	161	91.3%	8.7%	0.0%	100.0%
	Pt. Seduction TF	8/17+8/19	14	35.7%	64.3%	0.0%	100.0%
	Chilkat R. TF + Subsistence	8/17	9	0.0%	77.8%	22.2%	100.0%
	High Water Is (Chilkat In.)	8/13	53	32.1%	66.0%	1.9%	100.0%
	Set Net Site (Chilkat In.)	8/14	62	8.1%	74.2%	17.7%	100.0%
	W. Pt. Seduction	8/13	91	47.3%	48.3%	4.4%	100.0%
34	Pt. Sherman to Shikosi	8/21	73	23.3%	71.2%	5.5%	100.0%
	Pt. Seduction	8/21	86	61.6%	38.4%	0.0%	100.0%
	Seduction Pt. TF	8/25	45	57.8%	40.0%	2.2%	100.0%
	Mud Bay Pt. TF	8/25	70	70.0%	27.1%	2.9%	100.0%
	Chilkat R. TF + Subsistence		65	0.0%	93.8%	6.2%	100.0%
35	S. of Pt. Seduction	8/28	158	53.8%	45.6%	0.6%	100.0%
	S. Sullivan Island	8/28	117	18.8%	79.5%	1.7%	100.0%
	W. Pt. Seduction TF	8/30	16	43.8%	56.2%	0.0%	100.0%
	Chilkat Inlet TF	8/30	29	10.3%	86.2%	3.5%	100.0%
	Chilkat R. TF + Subsistence		64	0.0%	98.4%	1.6%	100.0%
36	Chilkat R. TF + Subsistence	9/6-7	31	0.0%	96.8%	3.2%	100.0%
37	Chilkat R. TF + Subsistence	9/12	18	0.0%	98.4%	1.6%	100.0%
	Chilkat Inlet	9/13	11	0.0%	100.0%	0.0%	100.0%
Total			4,063				

<sup>c</sup> All samples from specific sites in the commercial gillnet fishery unless labeled TF for test fishery.

Appendix C.1. Daily sockeye salmon counts and associated statistics  
from Chilkat Lake weir, 1989.

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
June 7	7	7	0.0000	0.0000
June 8	0	7	0.0000	0.0000
June 9	2	9	0.0000	0.0001
June 10	28	37	0.0002	0.0003
June 11	25	62	0.0002	0.0004
June 12	54	116	0.0004	0.0008
June 13	19	135	0.0001	0.0010
June 14	12	147	0.0001	0.0010
June 15	107	254	0.0008	0.0018
June 16	164	418	0.0012	0.0030
June 17	318	736	0.0023	0.0052
June 18	15	751	0.0001	0.0053
June 19	34	785	0.0002	0.0056
June 20	102	887	0.0007	0.0063
June 21	287	1,174	0.0020	0.0084
June 22	337	1,511	0.0024	0.0108
June 23	501	2,012	0.0036	0.0143
June 24	2,205	4,217	0.0157	0.0300
June 25	2,336	6,553	0.0166	0.0466
June 26	2,707	9,260	0.0193	0.0659
June 27	2,520	11,780	0.0179	0.0839
June 28	1,136	12,916	0.0081	0.0919
June 29	1,774	14,690	0.0126	0.1046
June 30	0	14,690	0.0000	0.1046
July 1	1,145	15,835	0.0082	0.1127
July 2	1,408	17,243	0.0100	0.1227
July 3	863	18,106	0.0061	0.1289
July 4	2,507	20,613	0.0178	0.1467
July 5	454	21,067	0.0032	0.1500
July 6	980	22,047	0.0070	0.1569
July 7	1,380	23,427	0.0098	0.1668
July 8	1,661	25,088	0.0118	0.1786
July 9	0	25,088	0.0000	0.1786
July 10	30	25,118	0.0002	0.1788
July 11	578	25,696	0.0041	0.1829
July 12	745	26,441	0.0053	0.1882
July 13	87	26,528	0.0006	0.1888
July 14	149	26,677	0.0011	0.1899
July 15	101	26,778	0.0007	0.1906
July 16	605	27,383	0.0043	0.1949
July 17	164	27,547	0.0012	0.1961
July 18	834	28,381	0.0059	0.2020
July 19	1,007	29,388	0.0072	0.2092
July 20	2,613	32,001	0.0186	0.2278
July 21	845	32,846	0.0060	0.2338
July 22	1,604	34,450	0.0114	0.2452
July 23	1,059	35,509	0.0075	0.2528
July 24	3,048	38,557	0.0217	0.2745
July 25	3,402	41,959	0.0242	0.2987
July 26	4,218	46,177	0.0300	0.3287
July 27	1,368	47,545	0.0097	0.3385
July 28	2,314	49,859	0.0165	0.3549
July 29	1,460	51,319	0.0104	0.3653
July 30	0	51,319	0.0000	0.3653
July 31	0	51,319	0.0000	0.3653
Aug. 1	138	51,457	0.0010	0.3663
Aug. 2	784	52,241	0.0056	0.3719
Aug. 3	193	52,434	0.0014	0.3733
Aug. 4	225	52,659	0.0016	0.3749
Aug. 5	895	53,554	0.0064	0.3812
Aug. 6	926	54,480	0.0066	0.3878
Aug. 7	600	55,080	0.0043	0.3921
Aug. 8	1,118	56,198	0.0080	0.4001
Aug. 9	1,142	56,340	0.0010	0.4011
Aug. 10	1,034	57,374	0.0074	0.4084
Aug. 11	306	57,680	0.0022	0.4106
Aug. 12	1,140	58,820	0.0081	0.4187
Aug. 13	0	58,820	0.0000	0.4187
Aug. 14	0	58,820	0.0000	0.4187
Aug. 15	0	58,820	0.0000	0.4187
Aug. 16	0	58,820	0.0000	0.4187
Aug. 17	0	58,820	0.0000	0.4187
Aug. 18	0	58,820	0.0000	0.4187
Aug. 19	6	58,826	0.0000	0.4188

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## Appendix C.1. (page 2 of 2)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Aug. 20	5	58,831	0.0000	0.4188
Aug. 21	19	58,850	0.0001	0.4189
Aug. 22	19	58,869	0.0001	0.4191
Aug. 23	219	59,088	0.0016	0.4206
Aug. 24	0	59,088	0.0000	0.4206
Aug. 25	693	59,781	0.0049	0.4256
Aug. 26	579	60,360	0.0041	0.4297
Aug. 27	1,678	62,038	0.0119	0.4416
Aug. 28	2,313	64,351	0.0165	0.4581
Aug. 29	1,305	65,656	0.0093	0.4674
Aug. 30	780	66,436	0.0056	0.4729
Aug. 31	454	66,890	0.0032	0.4762
Sept. 1	1,024	67,914	0.0073	0.4835
Sept. 2	1,207	69,121	0.0086	0.4921
Sept. 3	499	69,620	0.0036	0.4956
Sept. 4	255	69,875	0.0018	0.4974
Sept. 5	6,283	76,158	0.0447	0.5421
Sept. 6	895	77,053	0.0064	0.5485
Sept. 7	763	77,816	0.0054	0.5539
Sept. 8	183	77,999	0.0013	0.5553
Sept. 9	0	77,999	0.0000	0.5553
Sept. 10	0	77,999	0.0000	0.5553
Sept. 11	0	77,999	0.0000	0.5553
Sept. 12	0	77,999	0.0000	0.5553
Sept. 13	270	78,269	0.0019	0.5572
Sept. 14	423	78,692	0.0030	0.5602
Sept. 15	1,154	79,846	0.0082	0.5684
Sept. 16	9,063	88,909	0.0645	0.6329
Sept. 17	4,109	93,018	0.0293	0.6622
Sept. 18	9,178	102,196	0.0653	0.7275
Sept. 19	10,774	112,970	0.0767	0.8042
Sept. 20	7,053	120,023	0.0502	0.8544
Sept. 21	5,321	125,344	0.0379	0.8923
Sept. 22	1,829	127,173	0.0130	0.9053
Sept. 23	0	127,173	0.0000	0.9053
Sept. 24	0	127,173	0.0000	0.9053
Sept. 25	0	127,173	0.0000	0.9053
Sept. 26	0	127,173	0.0000	0.9053
Sept. 27	0	127,173	0.0000	0.9053
Sept. 28	50	127,223	0.0004	0.9057
Sept. 29	919	128,142	0.0065	0.9122
Sept. 30	228	128,370	0.0016	0.9138
Oct. 1	1,516	129,886	0.0108	0.9246
Oct. 2	0	129,886	0.0000	0.9246
Oct. 3	83	129,969	0.0006	0.9252
Oct. 4	1,573	131,542	0.0112	0.9364
Oct. 5	651	132,193	0.0046	0.9410
Oct. 6	569	132,762	0.0041	0.9451
Oct. 7	60	132,822	0.0004	0.9455
Oct. 8	0	132,822	0.0000	0.9455
Oct. 9	0	132,822	0.0000	0.9455
Oct. 10	424	133,246	0.0030	0.9485
Oct. 11	155	133,401	0.0011	0.9496
Oct. 12	791	134,192	0.0056	0.9553
Oct. 13	355	134,547	0.0025	0.9578
Oct. 14	1,087	135,634	0.0077	0.9655
Oct. 15	241	135,875	0.0017	0.9673
Oct. 16	95	135,970	0.0007	0.9679
Oct. 17	1,073	137,043	0.0076	0.9756
Oct. 18	1,051	138,094	0.0075	0.9831
Oct. 19	365	138,459	0.0026	0.9856
Oct. 20	837	139,296	0.0060	0.9916
Oct. 21	187	139,483	0.0013	0.9929
Oct. 22	74	139,557	0.0005	0.9935
Oct. 23	565	140,122	0.0040	0.9975
Oct. 24	68	140,190	0.0005	0.9980
Oct. 25	26	140,216	0.0002	0.9982
Oct. 26	76	140,292	0.0005	0.9987
Oct. 27	77	140,369	0.0005	0.9992
Oct. 28	106	140,475	0.0008	1.0000
Oct. 29	0	140,475	0.0000	1.0000
Mean Day of Migration = Aug. 22			Variance = 1224.9 Days squared	

Appendix C.2. Daily sockeye salmon counts and associated statistics from Chilkoot Lake weir, 1989.

Date	Daily Count	Cumulative Count	Daily of Total	Proportion of Total	Cumulative Proportion of Total
June 4	170	170	0.0031	0.0031	0.0031
June 5	114	284	0.0021	0.0052	0.0052
June 6	51	335	0.0009	0.0061	0.0061
June 7	58	393	0.0011	0.0072	0.0072
June 8	63	456	0.0011	0.0083	0.0083
June 9	43	499	0.0008	0.0091	0.0091
June 10	72	571	0.0013	0.0104	0.0104
June 11	36	607	0.0007	0.0111	0.0111
June 12	127	734	0.0023	0.0134	0.0134
June 13	1,328	2,062	0.0242	0.0376	0.0376
June 14	1,065	3,127	0.0194	0.0570	0.0570
June 15	1,036	4,163	0.0189	0.0758	0.0758
June 16	488	4,651	0.0089	0.0847	0.0847
June 17	186	4,837	0.0034	0.0881	0.0881
June 18	28	4,865	0.0005	0.0886	0.0886
June 19	1,011	5,876	0.0184	0.1070	0.1070
June 20	180	6,056	0.0033	0.1103	0.1103
June 21	6,031	12,087	0.1099	0.2202	0.2202
June 22	12,106	24,193	0.2205	0.4407	0.4407
June 23	1,636	25,829	0.0298	0.4705	0.4705
June 24	308	26,137	0.0056	0.4761	0.4761
June 25	354	26,491	0.0064	0.4825	0.4825
June 26	810	27,301	0.0148	0.4973	0.4973
June 27	384	27,685	0.0070	0.5043	0.5043
June 28	162	27,847	0.0030	0.5072	0.5072
June 29	513	28,360	0.0093	0.5166	0.5166
June 30	36	28,396	0.0007	0.5172	0.5172
July 1	207	28,603	0.0038	0.5210	0.5210
July 2	334	28,937	0.0061	0.5271	0.5271
July 3	124	29,061	0.0023	0.5293	0.5293
July 4	224	29,285	0.0041	0.5334	0.5334
July 5	159	29,444	0.0029	0.5363	0.5363
July 6	43	29,487	0.0008	0.5371	0.5371
July 7	45	29,532	0.0008	0.5379	0.5379
July 8	80	29,612	0.0015	0.5394	0.5394
July 9	175	29,787	0.0032	0.5426	0.5426
July 10	134	29,921	0.0024	0.5450	0.5450
July 11	42	29,963	0.0008	0.5458	0.5458
July 12	19	29,982	0.0003	0.5461	0.5461
July 13	13	29,995	0.0002	0.5464	0.5464
July 14	106	30,101	0.0019	0.5483	0.5483
July 15	424	30,525	0.0077	0.5560	0.5560
July 16	565	31,090	0.0103	0.5663	0.5663
July 17	240	31,330	0.0044	0.5707	0.5707
July 18	263	31,593	0.0048	0.5755	0.5755
July 19	538	32,131	0.0098	0.5853	0.5853
July 20	215	32,346	0.0039	0.5892	0.5892
July 21	115	32,461	0.0021	0.5913	0.5913
July 22	186	32,647	0.0034	0.5947	0.5947
July 23	178	32,825	0.0032	0.5979	0.5979
July 24	903	33,728	0.0164	0.6144	0.6144
July 25	537	34,265	0.0098	0.6241	0.6241
July 26	204	34,469	0.0037	0.6279	0.6279
July 27	234	34,703	0.0043	0.6321	0.6321
July 28	304	35,007	0.0055	0.6377	0.6377
July 29	582	35,589	0.0106	0.6483	0.6483
July 30	679	36,268	0.0124	0.6606	0.6606
July 31	662	36,930	0.0121	0.6727	0.6727
Aug. 1	1,123	38,053	0.0205	0.6931	0.6931
Aug. 2	118	38,171	0.0021	0.6953	0.6953
Aug. 3	186	38,357	0.0034	0.6987	0.6987
Aug. 4	350	38,707	0.0064	0.7050	0.7050
Aug. 5	496	39,203	0.0090	0.7141	0.7141
Aug. 6	521	39,724	0.0095	0.7236	0.7236
Aug. 7	116	39,840	0.0021	0.7257	0.7257
Aug. 8	631	40,471	0.0115	0.7372	0.7372
Aug. 9	946	41,417	0.0172	0.7544	0.7544
Aug. 10	1,301	42,718	0.0237	0.7781	0.7781
Aug. 11	511	43,229	0.0093	0.7874	0.7874
Aug. 12	287	43,516	0.0052	0.7926	0.7926
Aug. 13	306	43,822	0.0056	0.7982	0.7982
Aug. 14	534	44,356	0.0097	0.8079	0.8079
Aug. 15	462	44,818	0.0084	0.8164	0.8164
Aug. 16	368	45,186	0.0067	0.8231	0.8231

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Appendix C.2. (page 2 of 2)

Date	Daily Count	Cumulative Count	Daily Proportion of Total	Cumulative Proportion of Total
Aug. 17	175	45,361	0.0032	0.8262
Aug. 18	281	45,642	0.0051	0.8314
Aug. 19	31	45,673	0.0006	0.8319
Aug. 20	95	45,768	0.0017	0.8337
Aug. 21	1,235	47,003	0.0225	0.8562
Aug. 22	356	47,359	0.0065	0.8626
Aug. 23	164	47,523	0.0030	0.8656
Aug. 24	186	47,709	0.0034	0.8690
Aug. 25	251	47,960	0.0046	0.8736
Aug. 26	506	48,466	0.0092	0.8828
Aug. 27	240	48,706	0.0044	0.8872
Aug. 28	709	49,415	0.0129	0.9001
Aug. 29	716	50,131	0.0130	0.9131
Aug. 30	423	50,554	0.0077	0.9208
Aug. 31	297	50,851	0.0054	0.9262
Sept. 1	452	51,303	0.0082	0.9345
Sept. 2	230	51,533	0.0042	0.9387
Sept. 3	502	52,035	0.0091	0.9478
Sept. 4	571	52,606	0.0104	0.9582
Sept. 5	207	52,813	0.0038	0.9620
Sept. 6	201	53,014	0.0037	0.9656
Sept. 7	101	53,115	0.0018	0.9675
Sept. 8	122	53,237	0.0022	0.9697
Sept. 9	136	53,373	0.0025	0.9722
Sept. 10	92	53,465	0.0017	0.9739
Sept. 11	123	53,588	0.0022	0.9761
Sept. 12	133	53,721	0.0024	0.9785
Sept. 13	151	53,872	0.0028	0.9813
Sept. 14	157	54,029	0.0029	0.9841
Sept. 15	133	54,162	0.0024	0.9866
Sept. 16	87	54,249	0.0016	0.9881
Sept. 17	59	54,308	0.0011	0.9892
Sept. 18	31	54,339	0.0006	0.9898
Sept. 19	15	54,354	0.0003	0.9901
Sept. 20	23	54,377	0.0004	0.9905
Sept. 21	19	54,396	0.0003	0.9908
Sept. 22	75	54,471	0.0014	0.9922
Sept. 23	10	54,481	0.0002	0.9924
Sept. 24	25	54,506	0.0005	0.9928
Sept. 25	29	54,535	0.0005	0.9934
Sept. 26	24	54,559	0.0004	0.9938
Sept. 27	28	54,587	0.0005	0.9943
Sept. 28	40	54,627	0.0007	0.9950
Sept. 29	56	54,683	0.0010	0.9960
Sept. 30	14	54,697	0.0003	0.9963
Oct. 1	26	54,723	0.0005	0.9968
Oct. 2	8	54,731	0.0001	0.9969
Oct. 3	23	54,754	0.0004	0.9973
Oct. 4	12	54,766	0.0002	0.9976
Oct. 5	10	54,776	0.0002	0.9977
Oct. 6	4	54,780	0.0001	0.9978
Oct. 7	37	54,817	0.0007	0.9985
Oct. 8	3	54,820	0.0001	0.9985
Oct. 9	26	54,846	0.0005	0.9990
Oct. 10	7	54,853	0.0001	0.9991
Oct. 11	27	54,880	0.0005	0.9996
Oct. 12	7	54,887	0.0001	0.9998
Oct. 13	3	54,890	0.0001	0.9998
Oct. 14	3	54,893	0.0001	0.9999
Oct. 15	1	54,894	0.0000	0.9999
Oct. 16	1	54,895	0.0000	0.9999
Oct. 17	5	54,900	0.0001	1.0000
Oct. 18	0	54,900	0.0000	1.0000
Oct. 19	0	54,900	0.0000	1.0000
Oct. 20	0	54,900	0.0000	1.0000
Oct. 21	0	54,900	0.0000	1.0000
Oct. 22	0	54,900	0.0000	1.0000
Oct. 23	0	54,900	0.0000	1.0000
Oct. 24	0	54,900	0.0000	1.0000
Oct. 25	0	54,900	0.0000	1.0000
Oct. 26	0	54,900	0.0000	1.0000
Oct. 27	0	54,900	0.0000	1.0000
Oct. 28	0	54,900	0.0000	1.0000
Oct. 29	0	54,900	0.0000	1.0000
Oct. 30	0	54,900	0.0000	1.0000
Mean Day of Migration = July		15	Variance = 841.3 Days squared	

Appendix C.3. Age composition of sockeye salmon in the Berners, Antler/Gilkey, and Lace River escapements by sex and age class, 1989.

Brood Year and Age Class										
		1986		1985			1984		1983	Total
		0.2	1.1	0.3	1.2	2.1	1.3	2.2	2.3	
A. Samples combined from all 3 rivers, sampled 8/8/89 - 8/10/89.										
Male										
Sample Size	5	3		18	1	118	2	1	148	
Percent	1.8	1.1		6.3	0.4	41.4	0.7	0.4	51.9	
Std. Error	0.8	0.6		1.4	0.3	2.9	0.5	0.3	2.9	
Female										
Sample Size			6	1		125		5	137	
Percent			2.1	0.4		43.9		1.8	48.1	
Std. Error			0.8	0.3		2.9		0.8	2.9	
All Fish										
Sample Size	5	3	6	19	1	243	2	6	285	
Percent	1.8	1.1	2.1	6.7	0.4	85.3	0.7	2.1	100.0	
Std. Error	0.8	0.6	0.8	1.5	0.3	2.1	0.5	0.8		
B. Samples from the Berners River, sampled 8/8/89.										
Male										
Sample Size		2		3		14			19	
Percent		5.6		8.3		38.9			52.8	
Std. Error		3.9		4.7		8.2			8.4	
Female										
Sample Size						15		2	17	
Percent						41.7		5.6	47.2	
Std. Error						8.3		3.9	8.4	
All Fish										
Sample Size		2		3		29		2	36	
Percent		5.6		8.3		80.6		5.6	100.0	
Std. Error		3.9		4.7		6.7		3.9		
C. Samples from the Lace River, sampled 8/8/89 and 8/9/89.										
Male										
Sample Size	5	1		13	1	79	2	1	102	
Percent	2.4	0.5		6.1	0.5	37.3	0.9	0.5	48.1	
Std. Error	1.0	0.5		1.6	0.5	3.3	0.7	0.5	3.4	
Female										
Sample Size			6	1		101		2	110	
Percent			2.8	0.5		47.6		0.9	51.9	
Std. Error			1.1	0.5		3.4		0.7	3.4	
All Fish										
Sample Size	5	1	6	14	1	180	2	3	212	
Percent	2.4	0.5	2.8	6.6	0.5	84.9	0.9	1.4	100.0	
Std. Error	1.0	0.5	1.1	1.7	0.5	2.5	0.7	0.8		
D. Samples from the Antler/Gilkey River, sampled 8/10/89.										
Male										
Sample Size				2		25			27	
Percent				5.4		67.6			73.0	
Std. Error				3.8		7.8			7.4	
Female										
Sample Size						9		1	10	
Percent						24.3		2.7	27.0	
Std. Error						7.1		2.7	7.4	
All Fish										
Sample Size				2		34		1	37	
Percent				5.4		91.9		2.7	100.0	
Std. Error				3.8		4.5		2.7		

Appendix C.4. Age composition of sockeye salmon in the Chilkat Lake escapement by sex, age class, and escapement period, 1989.

Brood Year and Age Class								
	1985	1984		1983			1982	1981
	1.2	1.3	2.2	1.4	2.3	3.2	3.3	4.3
Total								
Escapement Dates:	(June 4 - 18)							
Sample Dates:	(June 9 - 17)							
Male								
Sample Size	2	157	1		43			203
Percent	0.7	55.5	0.4		15.2			71.7
Std. Error	0.4	2.3	0.3		1.7			2.1
Number	5	417	3		114			539
Female								
Sample Size		59			21			80
Percent		20.8			7.4			28.3
Std. Error		1.9			1.2			2.1
Number		156			56			212
All Fish								
Sample Size	2	216	1		64			283
Percent	0.7	76.3	0.4		22.6			100.0
Std. Error	0.4	2.0	0.3		2.0			
Number	5	573	3		170			751
Escapement Dates:	(June 19 - 25)							
Sample Dates:	(June 18 - 23)							
Male								
Sample Size	1	140	2		44			187
Percent	0.3	49.0	0.7		15.4			65.4
Std. Error	0.3	2.9	0.5		2.1			2.7
Number	20	2,840	41		893			3,794
Female								
Sample Size		71	1	1	26			99
Percent		24.8	0.3	0.3	9.1			34.6
Std. Error		2.5	0.3	0.3	1.7			2.7
Number		1,441	20	20	527			2,008
All Fish								
Sample Size	1	211	3	1	70			286
Percent	0.3	73.8	1.0	0.3	24.5			100.0
Std. Error	0.3	2.5	0.6	0.3	2.5			
Number	20	4,281	61	20	1,420			5,802
Escapement Dates:	(June 26 - July 2)							
Sample Dates:	(June 25 - 30)							
Male								
Sample Size		103	2		54			159
Percent		41.0	0.8		21.5			63.3
Std. Error		3.1	0.6		2.6			3.0
Number		4,387	85		2,300			6,772
Female								
Sample Size		54	2		36			92
Percent		21.5	0.8		14.3			36.7
Std. Error		2.6	0.6		2.2			3.0
Number		2,300	85		1,533			3,918
All Fish								
Sample Size		157	4		90			251
Percent		62.5	1.6		35.9			100.0
Std. Error		3.0	0.8		3.0			
Number		6,687	170		3,833			10,690
Escapement Dates:	(July 3 - 16)							
Sample Dates:	(July 4 - 14)							
Male								
Sample Size	3	108	3	1	66			181
Percent	1.1	39.1	1.1	0.4	23.9			65.6
Std. Error	0.6	2.9	0.6	0.4	2.5			2.8
Number	110	3,968	110	37	2,425			6,650
Female								
Sample Size		43	1		51			95
Percent		15.6	0.4		18.5			34.4
Std. Error		2.2	0.4		2.3			2.8
Number		1,580	37		1,873			3,490
All Fish								
Sample Size	3	151	4	1	117			276
Percent	1.1	54.7	1.4	0.4	42.4			100.0
Std. Error	0.6	3.0	0.7	0.4	2.9			
Number	110	5,548	147	37	4,298			10,140

-Continued-

Brood Year and Age Class									
	1985	1984		1983			1982	1981	Total
	1.2	1.3	2.2	1.4	2.3	3.2	3.3	4.3	
Escapement Dates:	(July 17 - 23)								
Sample Dates:	(July 17 - 22)								
Male									
Sample Size		108	5		47				160
Percent		44.6	2.1		19.4				66.1
Std. Error		3.2	0.9		2.5				3.0
Number		3,627	168		1,578				5,373
Female									
Sample Size	3	47	2		30				82
Percent	1.2	19.4	0.8		12.4				33.9
Std. Error	0.7	2.5	0.6		2.1				3.0
Number	101	1,578	67		1,007				2,753
All Fish									
Sample Size	3	155	7		77				242
Percent	1.2	64.0	2.9		31.8				100.0
Std. Error	0.7	3.0	1.1		3.0				
Number	101	5,205	235		2,585				8,126
Escapement Dates:	(July 24 - August 6)								
Sample Dates:	(July 23 - August 4)								
Male									
Sample Size	2	238	5	1	71				317
Percent	0.4	45.6	1.0	0.2	13.6				60.7
Std. Error	0.3	2.2	0.4	0.2	1.5				2.1
Number	73	8,650	182	36	2,580				11,521
Female									
Sample Size		149	4	1	51				205
Percent		28.5	0.8	0.2	9.8				39.3
Std. Error		2.0	0.4	0.2	1.3				2.1
Number		5,415	145	37	1,853				7,450
All Fish									
Sample Size	2	387	9	2	122				522
Percent	0.4	74.1	1.7	0.4	23.4				100.0
Std. Error	0.3	1.9	0.6	0.3	1.8				
Number	73	14,065	327	73	4,433				18,971
Escapement Dates:	(August 7 - 27)								
Sample Dates:	(August 7 - 26)								
Male									
Sample Size	4	103	14		15				136
Percent	1.5	38.7	5.3		5.6				51.1
Std. Error	0.7	2.9	1.3		1.4				3.0
Number	114	2,926	398		426				3,864
Female									
Sample Size	1	81	8		40				130
Percent	0.4	30.5	3.0		15.0				48.9
Std. Error	0.4	2.8	1.0		2.2				3.0
Number	28	2,302	227		1,137				3,694
All Fish									
Sample Size	5	184	22		55				266
Percent	1.9	69.2	8.3		20.7				100.0
Std. Error	0.8	2.8	1.7		2.4				
Number	142	5,228	625		1,563				7,558
Escapement Dates:	(August 28 - Sept. 17)								
Sample Dates:	(August 30 - Sept. 15)								
Male									
Sample Size	7	72	151		83	1			314
Percent	1.3	13.5	28.3		15.5	0.2			58.8
Std. Error	0.5	1.5	1.9		1.6	0.2			2.1
Number	406	4,177	8,760		4,816	58			18,217
Female									
Sample Size	1	70	80		69				220
Percent	0.2	13.1	15.0		12.9				41.2
Std. Error	0.2	1.4	1.5		1.4				2.1
Number	58	4,061	4,641		4,003				12,763
All Fish									
Sample Size	8	142	231		152	1			534
Percent	1.5	26.6	43.3		28.5	0.2			100.0
Std. Error	0.5	1.9	2.1		1.9	0.2			
Number	464	8,238	13,401		8,819	58			30,980

-Continued-

Brood Year and Age Class									
	1985	1984		1983			1982	1981	Total
	1.2	1.3	2.2	1.4	2.3	3.2	3.3	4.3	
Escapement Dates:	(Sept. 18 - 24)								
Sample Dates:	(Sept. 17 - 23)								
Male									
Sample Size	2	17	167		41		1		228
Percent	0.4	3.5	34.0		8.4		0.2		46.4
Std. Error	0.3	0.8	2.1		1.2		0.2		2.2
Number	139	1,183	11,617		2,852		69		15,860
Female									
Sample Size		22	169		70		1	1	263
Percent		4.5	34.4		14.3		0.2	0.2	53.6
Std. Error		0.9	2.1		1.6		0.2	0.2	2.2
Number		1,530	11,756		4,869		70	70	18,295
All Fish									
Sample Size	2	39	336		111		2	1	491
Percent	0.4	7.9	68.4		22.6		0.4	0.2	100.0
Std. Error	0.3	1.2	2.1		1.9		0.3	0.2	
Number	139	2,713	23,373		7,721		139	70	34,155
Escapement Dates:	(Sept. 25 - October 28)								
Sample Dates:	(Sept. 27 - October 25)								
Male									
Sample Size	1	5	224		63				293
Percent	0.1	0.7	32.2		9.1				42.1
Std. Error	0.1	0.3	1.7		1.1				1.8
Number	18	92	4,122		1,159				5,391
Female									
Sample Size	1	13	257		132				403
Percent	0.1	1.9	36.9		19.0				57.9
Std. Error	0.1	0.5	1.8		1.4				1.8
Number	18	239	4,729		2,429				7,415
All Fish									
Sample Size	2	18	502		201				723
Percent	0.3	2.5	69.4		27.8				100.0
Std. Error	0.2	0.6	1.7		1.6				
Number	37	331	9,236		3,698				13,302
Combined Periods (Percentages are weighted by period escapements)									
Male									
Sample Size	22	1,051	574	2	527	1	1		2,178
Percent	0.6	23.1	18.2	0.1	13.7	<0.1	<0.1		55.7
Std. Error	0.1	0.6	0.7	<0.1	0.6	<0.1	<0.1		0.9
Number	885	32,267	25,486	73	19,143	58	69		77,981
Female									
Sample Size	6	609	524	2	526		1	1	1,669
Percent	0.1	14.7	15.5	<0.1	13.8		<0.1	<0.1	44.3
Std. Error	0.1	0.6	0.6	<0.1	0.6		<0.1	<0.1	0.9
Number	205	20,602	21,707	57	19,287		70	70	61,998
All Fish									
Sample Size	28	1,660	1,119	4	1,059	1	2	1	3,874
Percent	0.8	37.6	33.9	0.1	27.4	<0.1	0.1	<0.1	100.0
Std. Error	0.2	0.7	0.7	<0.1	0.8	<0.1	0.1	<0.1	
Number	1,091	52,869	47,578	130	38,540	58	139	70	140,475

Appendix C.5. Test for significant changes among periods in the age composition of sockeye salmon in the Chilkat Lake escapement by age class, 1989.

Periods Compared	Brood Year and Age Class							
	1985	1984		1983			1982	1981
	1.2	1.3	2.2	1.4	2.3	3.2	3.3	4.3
1 , 2								
1 , 3		S**			S**			
1 , 4		S**			S**			
1 , 5		S**	S*		S*			
1 , 6								
1 , 7		S	S**					
1 , 8		S**	S**		S			
1 , 9		S**	S**					
1 , 10		S**	S**					
2 , 3		S**			S**			
2 , 4		S**			S**			
2 , 5		S*			S			
2 , 6								
2 , 7			S**					
2 , 8		S**	S**					
2 , 9		S**	S**					
2 , 10		S**	S**					
3 , 4		S						
3 , 5								
3 , 6		S**			S**			
3 , 7	S		S**		S**			
3 , 8		S**	S**		S*			
3 , 9		S**	S**		S**			
3 , 10		S**	S**		S*			
4 , 5		S*			S**			
4 , 6		S**			S**			
4 , 7		S**	S**		S**			
4 , 8		S**	S**		S**			
4 , 9		S**	S**		S**			
4 , 10		S**	S**		S**			
5 , 6		S**			S**			
5 , 7			S**		S**			
5 , 8		S**	S**					
5 , 9		S**	S**		S**			
5 , 10		S**	S**					
6 , 7	S		S**					
6 , 8		S**	S**		S			
6 , 9		S**	S**					
6 , 10		S**	S**		S			
7 , 8		S**	S**		S*			
7 , 9		S**	S**					
7 , 10	S*	S**	S**		S*			
8 , 9		S**	S**		S*			
8 , 10	S*	S**	S**					
9 , 10		S**			S*			

S = significant at probability = 0.10  
 S\* = significant at probability = 0.05  
 S\*\* = significant at probability = 0.01



Appendix C.6 Age composition of sockeye salmon in the Chilkat River  
Mainstem and Tahini River escapements by sex and age class,  
1989.

	Brood Year and Age Class						
	1986	1985		1984		1983	
	0.2	0.3	1.2	1.3	2.2	2.3	Total
A. Samples combined from both rivers.							
Male							
Sample Size	9	37	7	93	1	1	148
Percent	4.6	19.1	3.6	47.9	0.5	0.5	76.3
Std. Error	1.5	2.8	1.3	3.6	0.5	0.5	3.0
Female							
Sample Size		15		30		1	46
Percent		7.7		15.5		0.5	23.7
Std. Error		1.9		2.6		0.5	3.0
All Fish							
Sample Size	9	53	7	123	1	2	195
Percent	4.6	27.2	3.6	63.1	0.5	1.0	100.0
Std. Error	1.5	3.2	1.3	3.4	0.5	0.7	
B. Samples from the Chilkat River Mainstem, sampled 9/29/89 and 10/4/89.							
Male							
Sample Size	7	34	2	14			57
Percent	8.0	39.1	2.3	16.1			65.5
Std. Error	2.9	5.3	1.6	4.0			5.1
Female							
Sample Size		15		14		1	30
Percent		17.2		16.1		1.1	34.5
Std. Error		4.1		4.0		1.1	5.1
All Fish							
Sample Size	7	50	2	28		1	88
Percent	8.0	56.8	2.3	31.8		1.1	100.0
Std. Error	2.9	5.3	1.6	5.0		1.1	
C. Samples from the Tahini River, sampled 7/21/89, 7/30/89 and 8/4/89.							
Male							
Sample Size	2	3	5	79	1	1	91
Percent	1.9	2.8	4.7	73.8	0.9	0.9	85.0
Std. Error	1.3	1.6	2.0	4.3	0.9	0.9	3.5
Female							
Sample Size				16			16
Percent				15.0			15.0
Std. Error				3.5			3.5
All Fish							
Sample Size	2	3	5	95	1	1	107
Percent	1.9	2.8	4.7	88.8	0.9	0.9	100.0
Std. Error	1.3	1.6	2.0	3.1	0.9	0.9	

Appendix C.7. Age composition of sockeye salmon in the Chilkoot Lake escapement by sex, age class, and escapement period, 1989.

Brood Year and Age Class									
	1985		1984		1983		1982		Total
	1.2	1.3	2.2	1.4	2.3	2.4	3.3		
Escapement Dates:	(June 4 - 17)								
Sample Dates:	(June 6 - 17)								
Male									
Sample Size		101		5	43	2		151	
Percent		43.2		2.1	18.4	0.9		64.5	
Std. Error		3.2		0.9	2.5	0.6		3.1	
Number		2,088		103	889	41		3,121	
Female									
Sample Size		54		1	26	1	1	83	
Percent		23.1		0.4	11.1	0.4	0.4	35.5	
Std. Error		2.7		0.4	2.0	0.4	0.4	3.1	
Number		1,116		21	537	21	21	1,716	
All Fish									
Sample Size		155		6	69	3	1	234	
Percent		66.2		2.6	29.5	1.3	0.4	100.0	
Std. Error		3.0		1.0	2.9	0.7	0.4		
Number		3,204		124	1,426	62	21	4,837	
Escapement Dates:	(June 18 - 24)								
Sample Dates:	(June 19 - 24)								
Male									
Sample Size	3	124	8	1	58	2		196	
Percent	0.9	36.2	2.3	0.3	16.9	0.6		57.1	
Std. Error	0.5	2.6	0.8	0.3	2.0	0.4		2.7	
Number	186	7,700	497	62	3,602	124		12,171	
Female									
Sample Size		88		3	54		2	147	
Percent		25.7		0.9	15.7		0.6	42.9	
Std. Error		2.3		0.5	2.0		0.4	2.7	
Number		5,466		186	3,353		124	9,129	
All Fish									
Sample Size	3	212	8	4	112	2	2	343	
Percent	0.9	61.8	2.3	1.2	32.7	0.6	0.6	100.0	
Std. Error	0.5	2.6	0.8	0.6	2.5	0.4	0.4		
Number	186	13,166	497	248	6,955	124	124	21,300	
Escapement Dates:	(June 25 - July 8)								
Sample Dates:	(June 25 - July 8)								
Male									
Sample Size	3	102	1	4	51	1		162	
Percent	1.0	33.8	0.3	1.3	16.9	0.3		53.6	
Std. Error	0.5	2.6	0.3	0.6	2.1	0.3		2.7	
Number	35	1,172	12	46	587	12		1,864	
Female									
Sample Size	1	78	3	1	57			140	
Percent	0.3	25.8	1.0	0.3	18.9			46.4	
Std. Error	0.3	2.4	0.5	0.3	2.2			2.7	
Number	11	898	34	12	656			1,611	
All Fish									
Sample Size	4	180	4	5	108	1		302	
Percent	1.3	59.6	1.3	1.7	35.8	0.3		100.0	
Std. Error	0.6	2.7	0.6	0.7	2.6	0.3			
Number	46	2,070	46	58	1,243	12		3,475	
Escapement Dates:	(July 9 - 22)								
Sample Dates:	(July 9 - 22)								
Male									
Sample Size	17	135	7	2	41	1		203	
Percent	5.0	40.1	2.1	0.6	12.2	0.3		60.2	
Std. Error	1.1	2.5	0.7	0.4	1.7	0.3		2.5	
Number	153	1,216	63	18	369	9		1,828	
Female									
Sample Size	4	84	8	2	34	1	1	134	
Percent	1.2	24.9	2.4	0.6	10.1	0.3	0.3	39.8	
Std. Error	0.6	2.2	0.8	0.4	1.5	0.3	0.3	2.5	
Number	36	757	72	18	306	9	9	1,207	
All Fish									
Sample Size	21	219	15	4	75	2	1	337	
Percent	6.2	65.0	4.5	1.2	22.3	0.6	0.3	100.0	
Std. Error	1.2	2.5	1.1	0.6	2.1	0.4	0.3		
Number	189	1,973	135	36	675	18	9	3,035	

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Brood Year and Age Class								
	1985	1984		1983		1982		Total
	1.2	1.3	2.2	1.4	2.3	2.4	3.3	
Escapement Dates:	(July 23 - 29)							
Sample Dates:	(July 23 - 29)							
Male								
Sample Size	24	78	20	3	23			148
Percent	9.6	31.2	8.0	1.2	9.2			59.2
Std. Error	1.8	2.8	1.6	0.7	1.8			3.0
Number	283	918	235	35	271			1,742
Female								
Sample Size	4	64	6		28			102
Percent	1.6	25.6	2.4		11.2			40.8
Std. Error	0.8	2.6	0.9		1.9			3.0
Number	47	753	71		329			1,200
All Fish								
Sample Size	28	142	26	3	51			250
Percent	11.2	56.8	10.4	1.2	20.4			100.0
Std. Error	1.9	3.0	1.9	0.7	2.4			
Number	330	1,671	306	35	600			2,942
Escapement Dates:	(July 30 - August 5)							
Sample Dates:	(July 30 - August 5)							
Male								
Sample Size	10	81	12	1	23			127
Percent	4.5	36.3	5.4	0.4	10.3			57.0
Std. Error	1.3	3.1	1.5	0.4	2.0			3.2
Number	162	1,313	194	16	373			2,058
Female								
Sample Size	4	54	3	1	34			96
Percent	1.8	24.2	1.3	0.4	15.2			43.0
Std. Error	0.9	2.8	0.7	0.4	2.3			3.2
Number	65	875	49	16	551			1,556
All Fish								
Sample Size	14	135	15	2	57			223
Percent	6.3	60.5	6.7	0.9	25.6			100.0
Std. Error	1.6	3.2	1.6	0.6	2.8			
Number	227	2,188	243	32	924			3,614
Escapement Dates:	(August 6 - 19)							
Sample Dates:	(August 6 - 17)							
Male								
Sample Size	22	99	22	4	76		1	224
Percent	5.4	24.3	5.4	1.0	18.6		0.2	54.9
Std. Error	1.1	2.1	1.1	0.5	1.9		0.2	2.4
Number	349	1,570	349	63	1,206		15	3,552
Female								
Sample Size	5	108	15		53		3	184
Percent	1.2	26.5	3.7		13.0		0.7	45.1
Std. Error	0.5	2.1	0.9		1.6		0.4	2.4
Number	79	1,713	238		840		48	2,918
All Fish								
Sample Size	27	207	37	4	129		4	408
Percent	6.6	50.7	9.1	1.0	31.6		1.0	100.0
Std. Error	1.2	2.4	1.4	0.5	2.2		0.5	
Number	428	3,283	587	63	2,046		63	6,470
Escapement Dates:	(August 20 - 26)							
Sample Dates:	(August 21 - 26)							
Male								
Sample Size	1	35	4	1	36			77
Percent	0.7	25.0	2.9	0.7	25.7			55.0
Std. Error	0.7	3.6	1.4	0.7	3.6			4.1
Number	20	698	80	20	718			1,536
Female								
Sample Size	5	29	4		25			63
Percent	3.6	20.7	2.9		17.9			45.0
Std. Error	1.5	3.4	1.4		3.2			4.1
Number	100	578	80		499			1,257
All Fish								
Sample Size	6	64	8	1	61			140
Percent	4.3	45.7	5.7	0.7	43.6			100.0
Std. Error	1.7	4.1	1.9	0.7	4.1			
Number	120	1,276	160	20	1,217			2,793

-Continued-

Brood Year and Age Class								
	1985	1984		1983		1982		
	1.2	1.3	2.2	1.4	2.3	2.4	3.3	Total
Escapement Dates:	(August 27 - Sept. 2)							
Sample Dates:	(August 27 - Sept. 2)							
Male								
Sample Size	4	39	8		56		2	109
Percent	2.0	19.2	3.9		27.6		1.0	53.7
Std. Error	0.9	2.7	1.3		3.0		0.7	3.4
Number	61	589	121		846		30	1,647
Female								
Sample Size	1	30	4	1	55	1	2	94
Percent	0.5	14.8	2.0	0.5	27.1	0.5	1.0	46.3
Std. Error	0.5	2.4	0.9	0.5	3.0	0.5	0.7	3.4
Number	15	454	60	15	831	15	30	1,420
All Fish								
Sample Size	5	69	12	1	111	1	4	203
Percent	2.5	34.0	5.9	0.5	54.7	0.5	2.0	100.0
Std. Error	1.1	3.2	1.6	0.5	3.4	0.5	0.9	
Number	76	1,043	181	15	1,677	15	60	3,067
Escapement Dates:	(Sept. 3 - October 21)							
Sample Dates:	(Sept. 4 - 10)							
Male								
Sample Size	5	16	2	1	44		2	70
Percent	3.4	11.0	1.4	0.7	30.1		1.4	47.9
Std. Error	1.5	2.5	0.9	0.7	3.7		0.9	4.1
Number	115	369	46	23	1,015		46	1,614
Female								
Sample Size	3	20	3		49	1		76
Percent	2.1	13.7	2.1		33.6	0.7		52.1
Std. Error	1.2	2.8	1.2		3.8	0.7		4.1
Number	69	461	69		1,131	23		1,753
All Fish								
Sample Size	8	36	5	1	93	1	2	146
Percent	5.5	24.7	3.4	0.7	63.7	0.7	1.4	100.0
Std. Error	1.8	3.5	1.5	0.7	3.9	0.7	0.9	
Number	184	830	115	23	2,146	23	46	3,367
Combined Periods (Percentages are weighted by period escapements)								
Male								
Sample Size	89	810	84	22	451	6	5	1,467
Percent	2.5	32.1	2.9	0.7	18.0	0.3	0.2	56.7
Std. Error	0.3	1.2	0.4	0.2	0.9	0.2	0.1	1.2
Number	1,364	17,633	1,597	386	9,876	186	91	31,133
Female								
Sample Size	27	609	46	9	415	4	9	1,119
Percent	0.8	23.8	1.2	0.5	16.5	0.1	0.4	43.3
Std. Error	0.1	1.1	0.2	0.2	0.9	0.1	0.2	1.2
Number	422	13,071	673	268	9,033	68	232	23,767
All Fish								
Sample Size	116	1,419	130	31	866	10	14	2,586
Percent	3.3	55.9	4.1	1.2	34.4	0.5	0.6	100.0
Std. Error	0.3	1.2	0.4	0.3	1.1	0.2	0.2	
Number	1,786	30,704	2,270	654	18,909	253	324	54,900

Appendix C.8. Test for significant changes among periods in the age composition of sockeye salmon in the Chilkooot Lake escapement by age class, 1989.

Periods Compared	Brood Year and Age Class						
	1985	1984		1983		1982	
	1.2	1.3	2.2	1.4	2.3	2.4	3.3
1 , 2			S*				
1 , 3							
1 , 4	S**		S**		S*		
1 , 5	S**	S	S**		S**		
1 , 6	S**		S**				
1 , 7	S**	S**	S**				
1 , 8	S**	S**	S**			S**	
1 , 9	S*	S**	S**			S**	
1 , 10	S**	S**	S**			S**	
2 , 3							
2 , 4	S**					S**	
2 , 5	S**		S**			S**	
2 , 6	S**		S**			S	
2 , 7	S**	S**	S**				
2 , 8	S*	S**				S*	
2 , 9		S**	S			S**	
2 , 10	S**	S**				S**	
3 , 4	S**		S*			S**	
3 , 5	S**		S**			S**	
3 , 6	S**		S**			S**	
3 , 7	S**	S*	S**				
3 , 8		S**	S**				
3 , 9		S**	S**			S**	S
3 , 10	S*	S**				S**	
4 , 5	S*	S	S**				
4 , 6							
4 , 7		S**	S*			S**	
4 , 8		S**				S**	
4 , 9	S	S**				S**	
4 , 10		S**				S**	
5 , 6	S						
5 , 7	S					S**	
5 , 8	S*	S*				S**	
5 , 9	S**	S**				S**	S
5 , 10	S	S**	S*			S**	
6 , 7		S*					
6 , 8		S**				S**	
6 , 9	S	S**				S**	
6 , 10		S**				S**	
7 , 8						S**	
7 , 9	S*	S**				S**	
7 , 10		S**	S*			S**	
8 , 9		S*				S	
8 , 10		S**				S**	
9 , 10		S					

S = significant at probability = 0.10  
 S\* = significant at probability = 0.05  
 S\*\* = significant at probability = 0.01

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